



ADVANCED ADHESIVES REPORT

Your corrugating adhesives newsletter
from Harper/Love Adhesives Corporation

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Your corrugator is talking to you. Are you listening?

Whatever the problem, there are clues to its cause and solution



by Chris Polster
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As I have watched the corrugated industry grow, I have seen many changes. The need to increase production, reduce waste and improve overall quality has been the one thing that has not changed. These things have, however, driven many other changes in the industry. Today's paper is designed to perform better than ever for the corrugated container customer. Machines are running faster and faster every day. Some plants are producing more in a month than what we would have ever considered possible in my early days as a sheet catcher.

With the increased demands on plants, average speeds on the corrugators have climbed substantially. These higher speeds have led, in some cases, to issues on the machine that crew members in the plants may not have seen before. These problems will often lead to quality issues, and speed limitations that greatly reduce the production capabilities of the corrugator.

The good news is that most of these problems, which may seem catastrophic at the time, are often fairly easy to track back to their root cause. The machine is talking to you. Are you listening?

I use this phrase quite a bit when I am doing troubleshooting work on corrugators. I once told a plant manager, after a meeting concerning some machine troubles his plant had been seeing, that the machine was talking to us and we simply had to figure out what it was saying. As I left to go to work on the machine, I heard the plant manager turn to someone in his office and say, "Great! Of all the guys out there troubleshooting corrugators, I get one who thinks the damn thing is going to talk to him. He must be the corrugator whisperer or something." We ended up finding and resolving the problem the plant was having and I enjoy a wonderful relationship with that plant manager to this day.

What do I mean when I say, "your corrugator is talking to you?" With every recurring or lingering problem on a corrugator there is almost always a pattern. For example, many problems will show only on a specific type of paper. Many times when plants are having problems they equate them directly to a problem with the paper. The fact is, that while the problem may only be showing up on a specific paper type, chances are better than average that the root cause of the problem stems from the machine rather than the paper. If the problem goes unaddressed it will start showing up on other paper types.

Now, I don't want to give the impression that there is never a problem with paper that will cause runability issues on a corrugator. But in my experience, when I have been called in to assist a plant with problems they are seeing with a specific paper, the problem is more often tracked back to the machine rather than the paper.

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When parts on the machine begin to wear, they are no longer able to hold close tolerances. This wear will usually start showing up in very specific spots at first. For example, if the single facer pressure roll bearing is getting to the point where it needs to be changed, the operator will often see fluff-out on the edge of the web on certain liners, at wider widths, and usually during a splice, long before a maintenance man would normally be able to detect the problem. If the operator and maintenance man are aware of the warning signs to these problems they can schedule critical maintenance on the corrugator rather than have a problem cause costly down time. If they are not aware of these warning signs, they may spend a great deal of time fighting runability issues while attempting to find out what the mill has done to their 35# liner that is making it so difficult to run.

The liner issue is just one example. When dealing with recurring or lingering problems on the corrugator it is important to look for the pattern. Does the problem only show up on one single facer? Is it unique to a specific liner or medium? Does it get worse or only show up when running wider webs? Do the crews only have trouble during splices? These are the types of things that will tell the corrugator and maintenance crews where to look for the problem.

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Higher corrugator speeds mean that the corrugator has to be in better shape. Problems that would not be detectable at lower speeds can cripple the production and quality of a high-speed machine. With the ever-increasing demands of the

market place it is vital to a plant's success to get real-time solutions to their problems. One way to do this is to recognize the warning signs your corrugator is giving you. This is why I say the machine is talking to us, and we just have to listen.



Temperature and viscosity control

Control temperature and viscosity for consistent application of starch

by Bill Kahn and Bill Nikkel

Maintaining the viscosity of starch adhesive at a constant level is critical for consistent application. Because viscosity of the adhesive changes dramatically with temperature changes, it is important to control its temperature with a TVC (Temperature/Viscosity Control) system.

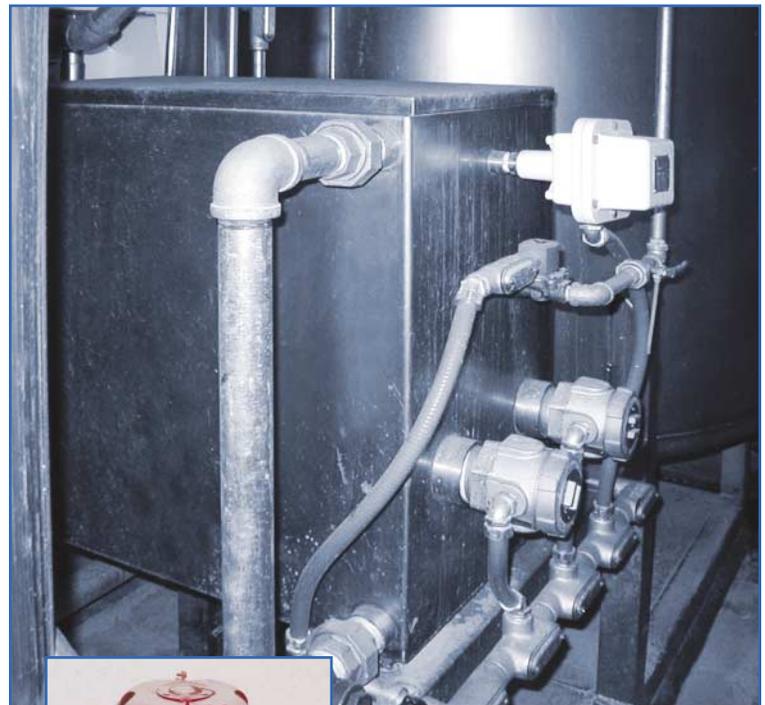
TVC systems designate the methods employed to keep starch at an appropriate temperature in the storage tanks. To ensure adequate run speed and to maintain a steady viscosity, most corrugating plants try to maintain starch at 100° to 105° F in storage.

Maintaining starch temperature is usually accomplished by running heated water through a series of coils located inside the storage tanks. These coils are usually made from 2-inch inside-diameter carbon steel or stainless steel tubing connected to a steam-heated open water tank or electrically powered industrial water heater.

TVC systems are controlled by a temperature sensor in the side of the storage tank. Setpoints are entered for the desired temperature. If the temperature drops below the setpoint, a centrifugal pump pushes heated water through the coils while the storage tank agitator circulates the warming adhesive. When the setpoint is reached, the pump is stopped. The heated water is maintained at a temperature 15° F below the gel point of the starch to prevent gelling around the coils. Most TVC systems also have controls and timers to run the agitators automatically for a while each hour.

It is important to keep the heating coils clean and free of encrusted starch which acts as an insulator and sharply reduces heat transfer from the coils to the adhesive.

Another concern over time is that the TVC system may leak water into the adhesive, causing viscosity breakdown. If this is suspected, a dye can be added to the water to help troubleshoot the issue.



*TVC system
recirculating pump*

The water tank is equipped with heaters, a thermostat, and an automatic water level valve. It maintains water volume and temperature for recirculation through the coils in the starch storage tank. A scale preventive such as Calci-Ban™ will keep the system free of calcium buildup and rust prolonging the life of the pump.



A primer on pumps

Whichever kind you use, be diligent and consistent in your preventive maintenance

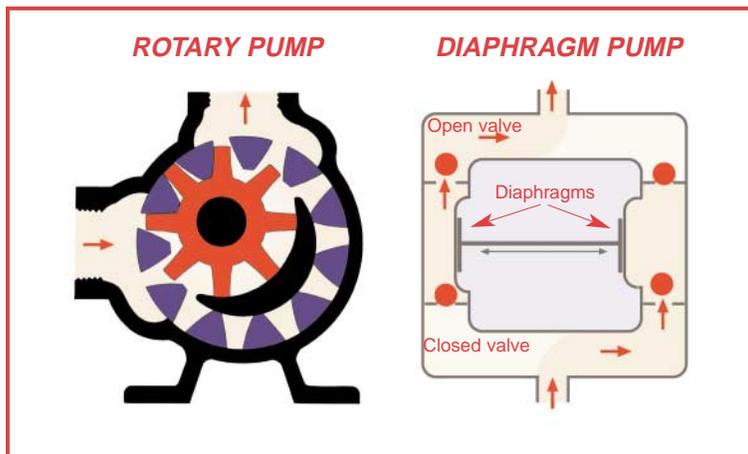
by Bill Kahn and Bill Nikkel

For years, the standard pump in the industry has been the internal gear pump, also known as a rotary gear positive displacement pump. At the single facers and at the glue machine, where these pumps are used to return the excess starch from the glue pans to the storage tanks, they are typically 2-inch pumps with a capacity of 35 to 40 gallons per minute.

In the starch preparation area, where they are used to feed the starch into the supply loop to the corrugator and to transfer starch from the mixer to the storage tanks, they are typically also 2-inch models but with a capacity of 90 to 100 gallons per minute.

To prevent pump damage and motor overloads as the result of blockages, these pumps should be equipped with a bypass relief valve.

The advantage of this style pump is that it delivers a constant flow at constant pressure. Disadvantages include the maintenance required to maintain the packing and the breakdown in viscosity caused by the shearing action.



Whichever type of pump you use, keep it working with good preventive maintenance and spare parts.

In the mid-1980s, box plants began to use air-operated double-diaphragm pumps as another option. These pumps are usually made of cast iron and have neoprene diaphragms to handle the alkaline environment.

Advantages of this type of pump are reduced shearing of the adhesive, very little temperature buildup, and a forgiving manner to allow foreign objects to pass through. Main disadvantages are the need to change diaphragms regularly and high consumption of compressed air.

Whichever option you choose, it is imperative to have a good preventive maintenance system in place, as well as spare pumps with the necessary connections in place to make possible a rapid changeover, if needed.

Often we find that the root cause of a flow or delivery problem is really a blockage or restriction in the pipe rather than a pump problem.

Harper/Love introduces Calci-Kleen™ hard water and scale cleaner

Calci-Kleen is a new cleaning agent formulated to get rid of calcium buildup without hard scrubbing or harsh acid washes or soda blasting.

Clean glue and metering rolls are vital to the successful operation of your corrugator. When the use of treated or untreated wastewater fills the glue roll cells with calcium carbonate, the rolls can no longer transfer adhesive to the flute tips properly. The calcium carbonate will also build up on metering rolls that will affect glue film thickness and consistency. These two problems can cause a plant costly waste, downtime, and maintenance/replacement costs. Regular use of Calci-Kleen will prevent these costly problems.

Most equipment will be thoroughly cleaned in just a few hours. Just add Calci-Kleen directly into an empty starch pan and allow the rolls to idle for a few hours. Then simply return the Calci-Kleen to the original drum or rinse down the drain. Wash off the rolls with running water. Calci-Kleen is biodegradable. It is also USDA and FDA approved for use in food, beverage, bottling, and pharmaceutical processing plants. This makes it fully approved for use in a box plant that produces food packaging.



Calci-Kleen is packaged in 450-pound drums and 2,500-pound totes.

CURE
Calcium buildup

Your corrugator talks!
TVC systems
A primer on pumps
Introducing Calci-Kleen™

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making good adhesives better™

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REPORT

ADVANCED
ADHESIVES



Calci-Kleen™

- Dissolves tough hard water scale, lime, and rust deposits
- Safe and easy to use
- Simply add to empty starch pan and let rolls turn for a few hours; wash clean with running water
- No need for hard scrubbing, harsh acid washes, or soda blasting
- Nontoxic, nonflammable, nonhazardous, biodegradable
- USDA and FDA approved for use in food, beverage, bottling, and pharmaceutical plants
- Reusable

CURE
Calcium buildup



Before Calci-Kleen: Glue roll with material embedded in cells.



After Calci-Kleen: Closeup of glue roll. Full cell capacity is now available for adhesive.