

ADVANCED ADHESIVES REPORT

YOUR CORRUGATING NEWSLETTER FROM HARPERLOVE

November 2020

Maintaining Your Starch Loop

by Freddy Ramsey and Todd Nelson

We don't often think about the condition of our starch lines. They are usually out of our sight and not on our mind until an issue arises with the starch supply. If the flow in the starch lines is restricted, the dosers, the day tanks, or even the glue pans may run out of adhesive. Restrictions in the flow can also stress the pumps. Overworked mechanical pumps can trip breakers or even burn up; overworking an air pump can damage the diaphragm and induce air into the adhesive causing foaming issues. Foaming can then affect the starch level probes in the glue pans. All these issues can lead to inadequate or improper starch application, and this will directly affect the quality of the bond.

Most plants do not have a daily clean-up routine for the starch system, so they depend on the end-of-the-week clean-ups to keep the starch loops and drops to the singlefacers and glue machines clean. In many cases, the weekly clean-up is inadequate.

Daily clean-up of the mixer is imperative to ensure the weight of each ingredient in a batch is within specification. A good time to do the daily cleaning is when borax is added to the hopper and the system is put into "No Batches" or "Hold" mode. Clean the mixer with a water hose and be sure to spray around the top of the mixer. Residue and splatter on the sides of the mixer can be



PLUGGED STARCH LINE



DEBRIS FROM LINE CLEARING



CLEAN STARCH LINE

washed off more easily if the mixer is washed daily. It is important that operators be trained on how to discharge the wash water properly.

At the end of the week, the storage tanks should be used to flush the starch lines with wash-up water. The tanks should be alternated so each one gets washed at least every other week. Make the appropriate amount of wash-up solution and circulate it through the loops. A common mistake is to circulate the cleaning solution through the starch loop, but not through the entire system. A flowing liquid will take the easiest route with the least restriction. In this case, that would be the starch loop. It is extremely important to make sure that when flushing the starch lines, we include the mixer, storage tanks, day tanks, dosers, infeed lines, supply pumps, valves, and pans. On the outfeed side, we again want to include all the lines, valves, and return pumps. One batch of water may not be enough to flush through the entire system. Extra wash-up water can be kept in the storage tank that is not in use to keep it clean. This clean up procedure must be done weekly to ensure the system is kept clean. If not done

regularly, more starch may build up in the lines than can be removed with a simple wash procedure.

Some plants add bleach to the water used to wash and flush the starch lines. Every plant should know the environmental impact of their particular clean-up solutions and should dispose of the discharge properly. While water with bleach will flush liquids from the lines, kill bacteria, and remove some starch residue, it will not effectively clean hardened starch, excess resin, or other additives. Evolution Starch Off is an enzyme-based product designed to remove starch and resin build-up without corrosive and dangerous caustic or chlorine cleaners. It actually eats away at the build-up in clogged starch lines and loops. If you have not cleaned your starch lines with a cleaning agent in a while, don't be surprised if you have some minor plug-ups at start after a thorough cleaning. This is telling you that you are breaking up the build-up in your lines. Flushing thoroughly with good clean water will help prevent this condition and provide better startups. Used properly on a regular basis, Evolution Starch Off will greatly reduce your starch flow issues.

Digital Readouts and Sensors

by Wayne Porell

To monitor corrugator conditions and produce high-quality, flat, dry board, today's corrugator operators can no longer break the plane of the machine to examine the board. Operators must rely on sensors and digital readouts for everything from starch gaps to temperature settings. The temperature and gap sensors should be cleaned and calibrated on a weekly basis to ensure they provide accurate information.

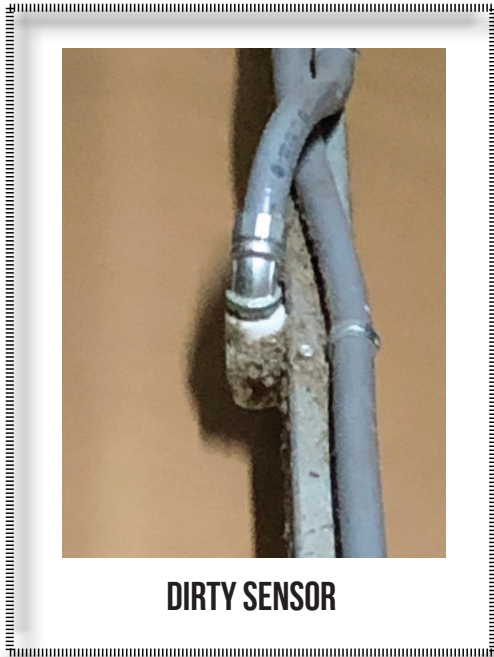
The sensors must be cleaned with a rag and a non-flammable cleaner to remove not only dust but also moisture and accumulated fibers. This should be part of the weekly preventive maintenance schedule

that is performed while the machine is down and locked out. The cleaning procedure should be clearly documented for the crews with pictures to help them identify all the sensors' locations and the specific parts that should be cleaned.

Gap Sensors

When the readout for the gap between the glue roll and metering roll is incorrect, you may be applying more or less starch than you intend. Less starch being applied can result in a weak bond creating delamination issues or zipper board. Sometimes the crew won't identify this issue until the board is

cured in the stack. When the board is still hot off the corrugator, it can have a moisture bond until it cures and cools, then it pulls apart easily. When the machine is applying more starch than optimal,



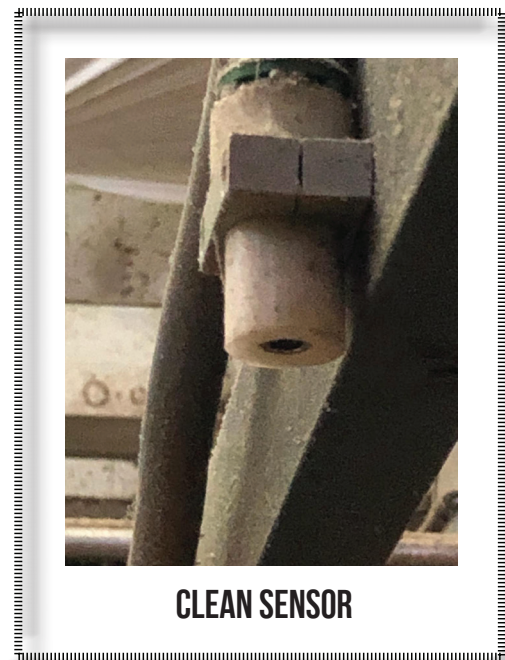
it will produce a wet sheet which can result in warp issues. The board may be flat as it comes off the corrugator, but when the starch dries it pulls the board in the wettest direction due to the starch not being fully gelled. Corrugator crews generally respond to wet board by adding more heat which can overly dry the liner and lead to score cracking. It also can cause washboarding and result in a poor print surface for the converting equipment.

Inaccuracy of the digital readout for the gap between the glue roll and lower corrugating roll can lead to fractured flutes if the actual gap is smaller than expected. If the caliper of the medium is 0.009" and the gap is set at 0.004", the medium must get crushed to fit through the gap, and this may result in fracturing at the flute tips. When the medium fractures, starch is absorbed in the fractures instead of sitting on the flute tips. This can lead to directional fiber tear issues, zipper board, or the sheet just falling apart leaving the machine at high speeds. When the

gap between the glue roll and the corrugating roll is wider than optimal, it can result in spotty glue lines. If the crew misinterprets the cause of the spotty glue lines, they may add starch which then leads to slinging, wet board, and post warp issues.

Temperature Sensors

If the temperature sensors aren't reading correctly, the preheaters or preconditioners will not respond appropriately and the liner and medium entering the machine won't be conditioned correctly. When you don't get enough heat on the liner it can result in delamination, or a green bond which allows the slitter blades to pull the bottom liner away from the medium resulting in edge delamination. This can also result in up warp. When you have too much heat applied to the bottom liner, it can cause a shallow bond from the starch not adequately penetrating the liner. This can also lead to zipper board, up warp, and cracked scores from taking too much moisture out of the paper. In some instances, taking too much moisture out of the liner will cause side-to-side or end-to-end warp because of paper shrinkage.



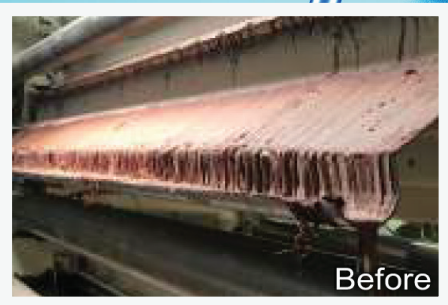
IN THIS ISSUE:

- Maintaining Your Starch Loop
- Digital Readouts and Sensors



Evolution

STARCH OFF



Before



After

EVOLUTION STARCH OFF is a cutting-edge “Clean in Place” starch remover. It is an optimized blend of enzyme-based detergents designed to remove starch buildups without using corrosive and dangerous caustic or chlorine cleaners.