

ADVANCED ADHESIVES REPORT

YOUR CORRUGATING NEWSLETTER FROM HARPERLOVE

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Troubleshooting Blow-Out Issues

by Wayne Porell

There are several ways to reduce blow-out/fluff-out issues from the Singlefacers/Modulefacers. The paper can be the cause of the issue, but most of the time it is due to the way we operate and take care of the machines.

Paper Issues

There is a very straightforward way to determine if the paper is causing your blow-outs. Take the roll down, rotate it, rehang it, and splice it back in. If the issue moves to the other side of the machine, then the paper is the source of your problem. If not, you have a machine issue. Most of the paper issues are due to a wet spot on the edge of the roll, a loose edge, or a high moisture streak or low caliper band on the edge of the roll. All of these can be checked either visually or with a roll hardness hammer.

Corrugator Rolls

There are several machine issues that can contribute to blow-outs at high speeds, and we will start by looking at the corrugator rolls. Glue can build up on the corrugator rolls if you have improperly set or worn glue dams which allow the glue to leak. These should be checked and repaired, if necessary, during each PM. The plastic inserts and spring should be able to move freely to hold a tight seal to the glue roll. If these do not move freely with a

slight push of your hand, then they won't hold tight to the glue roll. Glue can also get on the corrugator rolls if you have out-of-parallel issues between the metering and glue roll or the glue roll and corrugator roll. If one side is applying too much starch, it can sling off the glue roll onto the corrugator rolls.

Brakes

Worn millstand brakes or leaking/frozen calipers can cause blow-outs because they create uneven pressure side to side. It is analogous to uneven braking on a car—if one side is not working correctly, the car will pull to one side when you apply the brakes. With a millstand, uneven braking is not always obvious. The easiest way to identify this issue is to check the brake temperatures with an infrared camera or pyrometer while the machine is running. Run a full roll about $\frac{3}{4}$ way and then check the brakes' temperatures. If the temperatures vary by more than 10° - 15°F from side to side, then you likely have uneven braking and uneven pressure.



Vacuum

Improper vacuum pressure or hood pressure can create a blow-out issue at higher speeds, especially with heavyweight mediums. Maintaining proper vacuum pressure requires that the seals be in good condition. Stretched seals, missing pieces,

and worn or hard seals will create leaks which will reduce the vacuum or hood pressure needed to hold the medium to the corrugator roll. It is less costly to replace a seal than it is to have continued blow-outs. Sometimes, trying to save money on cheaper seals will cost you more in waste and downtime.



On vacuum machines, blow outs can be caused by a dirty or clogged vacuum system, vacuum slots, or holes. These need to remain clean to properly hold the medium to the corrugator roll. Spraying oil for starch build-up on these rolls is not recommended because oil spray can be sucked into the slots and holes and will capture dust that builds up on the inside of the rolls or piping. The clean-out fingers must remain in good shape to prevent build-up inside the slots. When the slots get clogged, the paper cannot be held properly to the roll because of reduced vacuum or hood pressure in that area.

Moisture

The proper amount of moisture in the steam shower is critical for forming and holding the flutes during the bonding stage. Dry steam will only heat the medium but will not soften or condition the fibers

to accept the starch correctly and quickly enough. Too much moisture could lead to water being blown onto the medium and cause it to stick to the corrugator rolls.

Temperature

Over or under heating the medium will impact bonding, especially on the edges. The medium should enter the corrugator rolls between 160°-180° F. Higher temperatures will not let the starch penetrate deeply enough before gelling out or drying, and lower temperatures will also lead to a poor bond. Out-of-parallel machine parts can also cause blow-outs on the loose edge from inadequate heat on the medium from a lack of tension. Worn bearings in the splicers rolls or wrap arm rolls can also cause the same issues.

Summary

As with many other aspects of corrugator troubleshooting, keeping the machine clean and well maintained will prevent most issues. Once you have ruled out paper issues, a clean and well maintained machine will run at high speeds without blow-outs.

Machine Alignment

by Wayne Porell

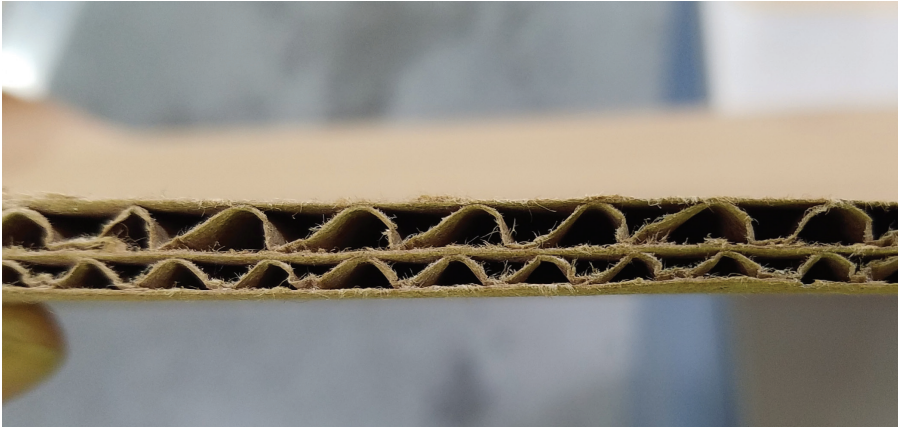
Machine alignment issues can create a wide range of issues that adversely affect run speeds and board quality. The ensuing twist warp, up/down warp, delamination, and crushed board cause the plant to suffer from reduced productivity and increased waste.

At the singlefacer, misalignment between the splicers and the mill stands can cause the splices to rip out due to unequal tension from side to side. Similarly, if the arms of the mill stands are not even with each other or the mill stands are not level and square, the liner will have uneven tension.

Misalignment from the splicers to the pre-heaters can cause a difference in heat transfer in the liner or medium. If the liner is heated to the correct temperature on the slack side, you will get a poor bond on the opposite side because it will be overheated. The excess heat can cause zipper board because the starch will gel before it can get good penetration into the paper. It can also lead to warp because the paper will dry more on the tight side than on the slack side. Not having the preheater level and parallel to the singlefacer/modulefacer will create the same issue.

Misalignment of the medium entering the machine can cause fractured flutes due to excess tension going into the corrugator rolls. The flutes on the loose side also may not form correctly because of a lack of tension. This can look like smashed flutes that just didn't form. The unequal tension can also cause missed splices. Similar to the impact of uneven heating on

If the pre-heaters, wrap arms or glue station aren't level and square to the hot plate section, you will have the same issues as the web guides not being square. This can also create crush issues with the medium passing through the glue station because the web can bounce.



When the shoes or rolls in the hot plate section aren't level and square with the side frames and hot plates, they can also cause delamination and warp. If the shoes or rolls are tighter to the hot plates on one side more than the other, one side can delaminate because the starch will dry before it can penetrate the bottom liner and gel out. If the rolls or shoes are out of parallel with the hot plates, they can cause the top belt to weave and shift the glue line from the medium to the bottom liner.

the liner, uneven conditioning of the medium can cause delamination issues. Unconditioned medium is difficult for the starch to bite into and creates a shallow bond that may look good coming off the corrugator but cracks apart after the combined board dries.

If the slitter/scorer or knife are out of parallel with the machine, they can lead to twist warp and edge delamination. If the slitter blades are out of parallel, they will not cut the combined web cleanly and will cause the bottom liner to pull apart if the starch is still in a green bond stage at high speeds. The knife being out of parallel will cause twist warp issues and stacking issues. This will also cause issues in converting from not having square board.

Out of parallel wrap arms can cause many of the same issues. Some corrugators have self-adjusting rolls to replace the idler rolls, but some of these rolls only work in one position. When the operators increase or decrease the wrap, the rolls don't work as well keeping the tension equal on both sides of the liner.

To sum it all up, nothing good can come from having out-of-square machine components. Misalignment can lead to a wide range of problems and have a significant impact on run speeds and board quality, which shows up as reduced productivity and increased waste.

Misalignment issues at the doublebacker can cause up or down warp, twist warp, delamination, or zipper board. The same issues can happen here as when the splicers aren't parallel to the mill stands. This can also create a difference in heat transfer at the pre-heaters which can lead to quality issues.



The web guides must be level and square with the pre-heaters, glue station and hot plate section to avoid twist warp. If they are not, the pre-heaters will heat one side of the web more than the other. At the glue station, this will cause uneven starch application from side to side, which can lead to warp or delamination. Misalignment can also allow the flute tips to double kiss the bottom liner when entering the hot plates which removes the starch from the flute tips and will cause delamination.



11101 Westlake Drive
P.O. Box 410408
Charlotte, NC 28241-0408

704.588.1350 • www.harperlove.com
email: salestech@harperlove.com

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