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YOUR CORRUGATING NEWSLETTER FROM HARPERLOVE

August 2021

Troubleshooting Board Crush Issues by Wayne Porell

Caliper loss and crushed board can lead to a wide range of issues within a customer's packaging operations and supply chain. Many of today's customers use automatic box set-up equipment in their packaging lines, and variations in board caliper can cause throughput issues and jams. Caliper loss can also lead to false scores, poor print quality, unreadable bar codes, loss of compression, and ultimately potential box failures in the field.

There are many potential causes of caliper loss, so successful diagnosis and resolution require a systematic approach. Start by identifying any changes that anyone made immediately before the appearance of the issue. It could be as simple as a repair or adjustment not correctly completed or a raw material change. The most recent change could quickly lead you to the root cause of the problem.

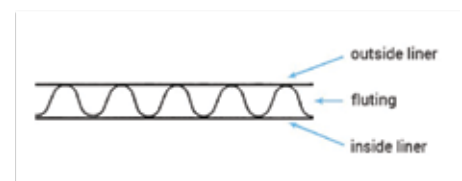
If you cannot identify a recent change that is causing the caliper loss, then you should proceed through a thorough review of the machine, starting at the wet end:

1. Add the caliper of both the liners and the medium to the flute height of the corrugator rolls. This gives you the theoretical caliper for the combined board.
2. Measure the caliper of samples of both liners cut from various positions across the web to check for consistency.

3. Cut samples of the singleface board on the operator side, center, and drive side of the machine. Inconsistencies here may indicate a worn or out-of-spec corrugator roll.

4. Cut samples of the doubleback liner on the operator side, center, and drive side, and measure the calipers these samples combined with the singleface samples. These combinations will provide the baseline caliper for the combined board and determine if variations in the paper are causing the variations in the board caliper.

5. Confirm that the medium pre-conditioner is turning at the correct speed and that the steam shower is operating correctly. Problems with this equipment can lead to flute fractures.



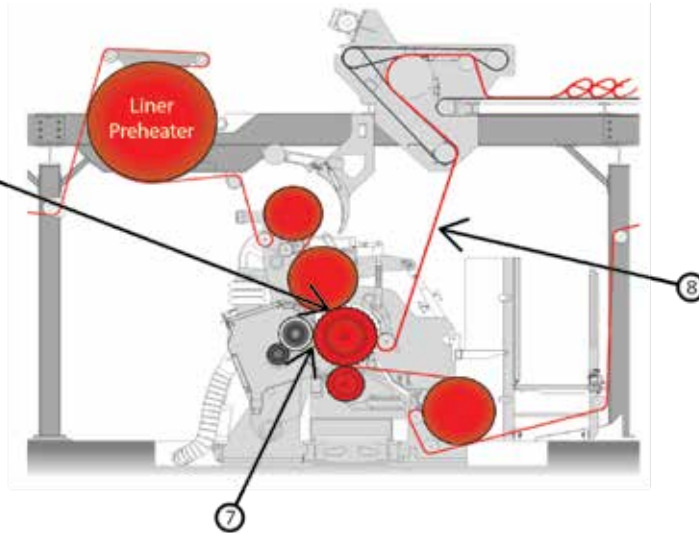
6. Check the pressure roll and corrugator rolls to confirm parallel. Too much corrugator roll loading pressure will cause crush.

7. Measure the gap between the glue roll and the bottom corrugator roll.

8. Cut and measure a sample of the combined board before the web guides check if the incline belts or a roll/wheel on the bridge are causing a crush.

9. Cut and measure a sample after the web guides before entering the doubleback glue station. Some parts of the web guides can wear and cause crush issues.

10. Cut a sample after the glue station again from all three areas across the web. Crush here can be caused by a) a rider roll or contact bar out of parallel, b) if the T.I.R. is out of range, or c) a bad

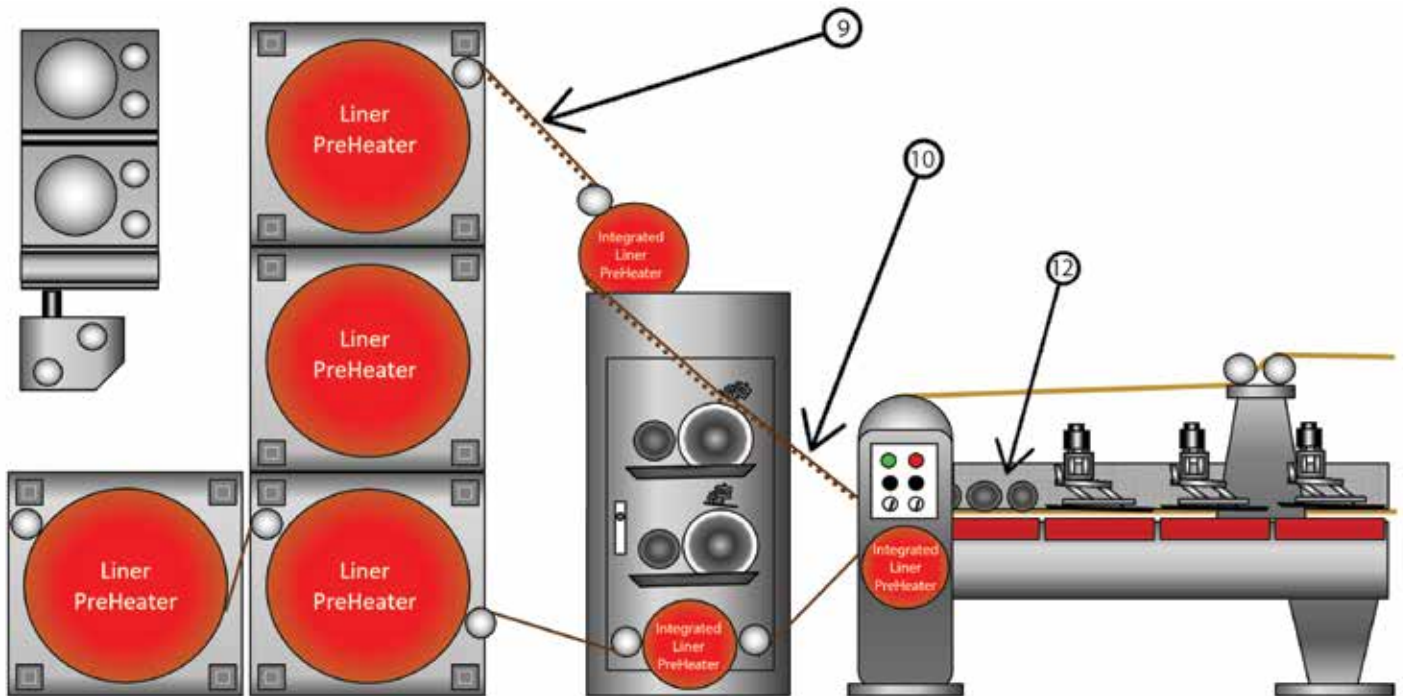


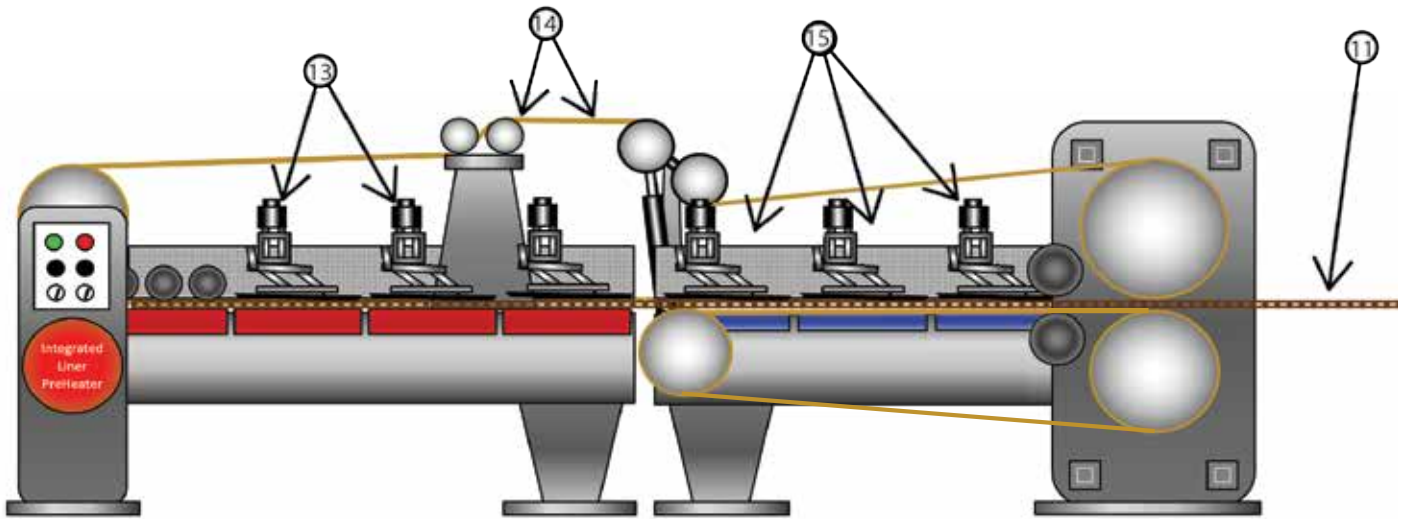
bearing in one of the rolls. Also, check the glue roll for the same issues.

11. The hot plate section can crush the board with several of its components. Cut samples directly after the combined board exits the head pulley. If you find crush exiting the head pulley, you

will need to cut samples from the outer edges of the web in the hot plates. If the hot plates have a high leading edge in the paper travel direction, this can cause crush and delamination issues. Also, look for dried starch on the hot plates, which can crush the board.

12. If the plant uses weight rolls, worn bearings can allow the roll to bounce and crush the board. If the weight roll arm gets hung up on one side, this puts all the weight of the roll on one side of the sheet instead of evenly distributing it.





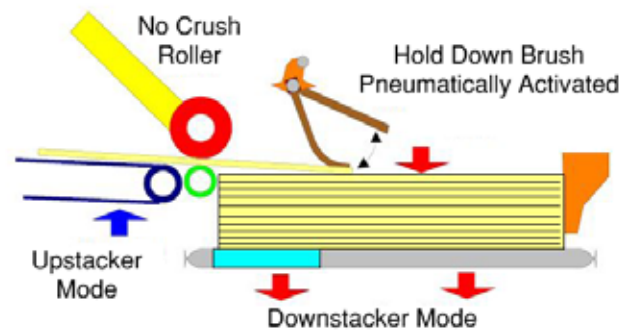
13. If the plant uses shoes on the hot plates and one of the shoes malfunctions and stays down, it will crush the board. This is why it is important to keep the moving parts of the shoes clean and working correctly.

14. Measure the caliper of the top corrugator belt across the width of the machine and at various positions on the web. Caliper variations in the belt can cause caliper variations in the board. Variations in the belt caliper can also lead to a weaker bond corresponding to the thin areas of the belt because of inadequate pressure to hold the web and bottom liner together. Evidence of this problem will show up as spotty glue lines on a soak test.

15. The traction section can cause crush issues if the shoes or ballast rolls are not set properly. The traction section issues are similar to the issues with the hot plate section ballast.

16. The cut-off knife can crush the combined board if the entrance rolls or exit rolls are out of parallel or have too much loading pressure.

17. No-crush wheels can crush the board if they are installed in the wrong direction. The fins in the middle of the wheels must be able to flex. If they are improperly installed and not able to flex, they can cause crush issues.



18. Finally, the stacker can cause crush if too much pressure is put on the no-crush wheels entering the stacker bed.

Identifying the causes of crushed board can sometimes be difficult and time-consuming. Still, a thorough and systematic approach will help you pinpoint the root causes and reduce customer issues and returns.

