Web Offset Mechanical Ghosting

Sappi Printer Technical Service

877 SappiHelp (727 7443)

Problem

During the course of the press run, a ghost image of the reverse-side print begins to show through the screen-build image on the opposite side necessitating frequent blanket washing to correct.

Description

Mechanical ghosting is a phenomenon exclusive to blanket-to-blanket web offset printing. It becomes visually apparent with a significant drop in dot gain/print density in the opposite-side screen areas of print; especially noticeable in screen values of 50% or less. The pattern of the ghosted image forms the shape of the heavier imagery printed on the opposite side of the web. Mechanical ghosting should not be confused with “show through,” a condition related to low paper opacity.

Mechanical ghosting is typically caused by blanket piling. The piling is primarily composed of ink residue build-up on the blanket(s) contributing to the creation of unequal tension between the opposing sides of the web on blanket release off impression. After washing blankets, the ghost image temporarily disappears—only to reappear as the blanket piling progressively rebuilds. Mechanical ghosting patterns generally correspond to the last side of the web to exit the impression nip.

The web press cylinder stack is configured so that the web will slightly wrap/follow the trailing blanket cylinder subsequent to full release. Premature release (snap-back) or delayed release (excessive wrap) from either the leading or trailing blanket can lead to inconsistent web tension and a variety of print irregularities. Mechanical ghosting is typically the result of delayed release from the leading blanket.

Although difficult to quantify, weak blanket-to-blanket nip pressure or high-force blanket release is known to contribute to mechanical ghosting. Therefore, it is critical to maintain uniformity in paper/blanket release by focusing on a complimentary balance of tension, blanket release properties, packing uniformity, ink tack, and fountain solution chemistry with optimal application to the plate. Mechanical ghosting appears primarily when printing on gloss coated papers since the increased surface-to-surface contact between smooth-surfaced papers and smooth-surfaced blankets can yield high tack forces which can jeopardize full ink transfer to the web.

Interestingly, mechanical ghosting is not as evident on gapless presses, because the blanket sleeves continually and incrementally move in circumferential direction of press operation. Blanket sleeve movement tends to minimize localized ink piling as the image continuously migrates to a different spot on the blanket.

For more information on blanket piling see also Sappi tech tips on Image Area Piling/Tail-edge Pick, and Vanishing Dot.

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Causes

- Under-packed or low blankets; insufficient nip pressure impeding ink transfer and negatively affecting blanket release.
- High-force blanket release from top-to-bottom or bottom-to-top.
    - High tack inks.
    - Fountain solution lacks lubricity or is running too dry.
    - High contact and tack force between smooth-finished blankets and smooth, gloss coated paper.
- Web tension between the infeed and chills is either too tight or too loose.
- Incremental difference in the side-to-side release characteristics of the paper.
- Layout of side-to-side opposing imagery.

Options and Solutions

- Check blanket thickness uniformity on incoming blankets with a bench-mounted Cady gauge to assure manufacturing consistency, and always try to dress press with a matching set.
- Check blanket over-bearer height with a Colight or Baldwin gauge. Adjust packing or blanket thickness to achieve unit-to-unit and top-to-bottom consistency. In particular, be sure that the last unit is sufficiently packed-up to prevent web over-feed in preceding units.
- Increase low print-nip pressure by increasing the thickness of blanket packing. The added pressure may improve ink transfer and help prevent blanket piling.
- Create and optimize proper blanket release by reducing ink tack and/or increasing fountain solution application on the opposite side of the web displaying the mechanical ghost (these actions will typically be taken on the side of the web that corresponds with the leading blanket). Reducing tack at the printing nip of the leading blanket will accomplish two things:
    - Allow the web to uniformly release from the leading blanket and more readily follow (wrap) the trailing blanket.
    - Improve ink transfer and minimize ink piling through uniform web release, one side at a time, without undue force from simultaneous or snap-back blanket release.

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- Dynamic ink temperature affects ink tack and transfer. Most ink suppliers recommend dynamic heatset ink temps of 75-83° F. (24-28° C.) as measured and averaged by a hand-held non-contact IR thermometer from various points across the ink train away from chilled oscillators. Consult with ink supplier and maintain chill temps accordingly. Fountain solution should be chilled to maintain a pan temp of 65-68° F. (18-20° C.).
- Try a fountain solution with higher glycol content or a non-piling additive for increased lubricity and quicker release capabilities.
- Consider using quick release blankets, which may necessitate changing to a rougher-surfaced blanket. Avoid mixing blanket types, which could result in web tension and register inconsistencies.
- Manage web tension between the infeed and chills to achieve the desired blanket release characteristic. Too much tension may result in web snap-back and circumferential misregister, whereas, too little tension may result in web-weave with lateral misregister.
- If possible, try turning rolls in the roll stand and compare top-to-bottom release characteristics of the paper.
- Consider “staggering” top/bottom units of print for the affected colors. For instance, if the problem color is a black solid opposing a black screen, change the color rotation by stacking cyan over black in the 1st unit and the black over cyan in the 2nd unit.

Cyan	Black	Magenta	Yellow
Black	Cyan	Magenta	Yellow