Progressive Dot Sharpening and Image Loss

Sappi Printer Technical Service

877 SappiHelp (727 7443)

Problem

During the course of the press run, the quarter-tone dots progressively and prematurely sharpen until color visibly diminishes and eventually disappears.

Description

Alternative terms may include vanishing dot, plate sharpening, or plate blinding. These are problems that can affect both sheetfed and web, and in extreme cases can be detected within 5,000 impressions. Usually, the problem is first noticed in quarter-tone screens, more predominant in stochastic printing, and more problematic when printing light ink coverage. Once the problem is detected and temporarily mitigated by plate and/or blanket washing, dot sharpening may reoccur with increasing frequency. Progressive dot sharpening or dot loss is usually reported more as a web nuance due to its repeated manifestation on longer press runs but shouldn't be confused with image blinding from normal plate wear.

There are both chemical and mechanical causes for progressive dot sharpening, but the shared characteristic is incomplete ink transfer, which can usually be traced back to blanket piling, plate piling, or plate contamination.

- **Image Area Blanket Piling** is the most common form of dot loss. If a simple washing of the blankets returns print to normal reproduction then the problem is image area piling, primarily the accumulation of non-transferring ink sludge and light paper debris. There are two types of image area blanket piling; image area piling within the same unit of print and image area piling of first-down colors in downstream units of print. If the image-area piling is concentrated on the trailing edge of the image, see Sappi tech tip on Image Area Piling/Tail-edge Pick.
- **Non-image Area Blanket Piling** is typically a preponderance of paper-related debris with lesser amounts of ink sludge across the blanket's non-image surface. This type of piling, often referred to as "milking", can accumulate to where it eventually creates an image area recess which can diminish ink transfer through poor plate-to-blanket and blanket-to-paper contact. In extreme cases, a non-image whitening may be visibly apparent, which is an indication that the paper coating may be weakly bound or breaking down due to abrasive action or over-aggressive and/or low pH fountain solution solubility.
- **Plate Piling or Plate Blinding** can be the result of either a build of non-transferring ink components or deposits of hydrophilic substances that reject ink receptivity and transfer. If the image is intact and quickly returns after a routine plate wash, the problem is most likely simple ink piling or hydrophilic interference. If the intact image area demands heavy scrubbing or won't fully

Progressive Dot Sharpening and Image Loss (continued)

Sappi Printer Technical Service

877 SappiHelp (727 7443)

return after washing, then the problem may be related to heavier deposits such as calcium carbonate, fountain solution gum, or surfactants from an accumulation of plate cleaners, blanket washes, and/or roller washes. Calcium deposits are particularly hard to remove and usually deposit around the outside diameter of the dot, slowly constricting the dot and sharpening the image as the build increases; a condition that may demand frequent plate remakes. For more specific information on the effects of calcium carbonate in the printing system, see Sappi tech tip on Calcium Carbonate.

Causes

- Ink is over-emulsified.
- Light ink coverage; slow fresh-ink displacement.
- Cumulative contamination of debris or surfactants in the fountain solution and ink rollers (ie: calcium carbonate, blanket wash, gum, plate cleaners, silicone additives, algae, mold, etc.).
- Highly acidic or overly aggressive fountain solution is breaking down ink resulting in over-emulsification and poor ink transfer.
- Highly acidic or overly aggressive fountain solution is breaking down the paper coating resulting in a white, milky blanket glaze.
- Inconsistent or poor water quality.
- Under-packed plates or blankets impeding ink transfer.
- High-force or inconsistent blanket release.
- Coarse or poorly ground ink causing ink pigment separation.
- High unit-to-unit ink tack build through the press.
- Ink film on rolls and at transfer points is too thin.
- Dynamic ink temperature too high; problems may first appear on the hotter gear-side of the press.
- Paper lacks sufficient coat strength.

Progressive Dot Sharpening and Image Loss (continued)

Sappi Printer Technical Service

877 SappiHelp (727 7443)

Options and Solutions

- Minimize water to the plate wherever possible.
- Check ink/fountain solution compatibility and ink water pick-up characteristics.
- Use ink take-off bars for light ink coverage whenever possible.
- Clean and flush the circulating system; check fountain solution dosage and replenish. This procedure should be a weekly maintenance consideration.
- Rinse, de-oxidize, and thoroughly final-rinse ink rollers with water-miscible roller wash. This procedure should be a weekly maintenance consideration.
- Monitor fountain solution for both pH and conductivity. High conductivity indicates high levels of contamination. The fountain solution mix should be buffered to a pH of 4.0 or higher.
- Check that water-miscible blanket wash is not contaminating the fountain solution during the auto-wash cycle. Also avoid using high water-miscible solvents for metering or slip-roll cleaning.
- Perform a microscopic analysis of plate surface for adhered deposits if the problem is determined to be plate blinding.
- Hard tap water is inconsistent and contains high levels of calcium which can adversely react to fountain solution causing calcium soaps. De-ionized water may be too aggressive and incompatible with fountain solution. Consider reverse-osmosis (RO) water treatment or a treatment system specifically designed for the lithographic print process.
- Check plate and blanket over-bearer height and adjust packing or blanket thickness to achieve unit-to-unit consistency.
- Try a rougher-surfaced, quick release blanket to reduce the force of blanket release, especially when running smooth-surfaced coated papers.
- Check ink grind; coarse-ground inks such as black, reflex blue, or metallics can be especially problematic when running through subsequent units of print with no fresh ink overprint.
- Check dynamic ink tack. If the ink is piling in its unit of print, dynamic ink tack may be too high. If the ink is piling in downstream units, it may be too “fast” (setting and building tack too fast on the paper).
- Thin ink films, often the result when printing stochastic, run higher in tack. Adjust for optimum ink film or consult ink supplier for formulation modification.

Progressive Dot Sharpening and Image Loss (continued)

Sappi Printer Technical Service

877 SappiHelp (727 7443)

- Dynamic ink temperature affects ink tack and transfer. Most ink suppliers recommend dynamic 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 also be chilled to maintain a pan temp of 65-68° F. (18-20° C.).
- Try a different production run of paper.