

# Gripper Slip



**Sappi Printer Technical Service**

877 SappiHelp (727 7443)

## Problem

The printed sheet exhibits circumferential or slightly angular unit-to-unit misregistration or slur which directly migrates from the gripper edge to the tail-edge of the sheet.

## Description

Misregister/slur in multi-color printing can be described as the misalignment or doubling of successive printed images causing a blurred or ghosted image effect and/or sheet-to-sheet color variation. One of the more common forms of misregister/slur is gripper slip in the units. This condition can be sporadic or continuous throughout the press run, but usually varies in intensity.

Considered a mechanical malfunction, gripper slip can be a press-specific problem or a combination of dynamics including high-force blanket release in conjunction with weak or dirty grippers and a layout with disproportionate ink coverage. Although paper characteristics such as size, surface smoothness, density, and caliper may be contributing factors, gripper slip is not considered to be a paper-specific stability problem. In most cases, there are many opportunities to mitigate a gripper slip problem on press.

Slur and misregister as a result of gripper slip can be determined by studying the migration of the slur which usually appears as a ghosted image. Since paper can not appreciably stretch immediately behind the grippers, gripper slip can easily be identified by an around-the-cylinder slur or ghost image starting from the gripper edge back to the tail. If the sheet slips more on one side of the press than the other, the slur or ghost image will move from cylinder direction on the gripper edge to a more angular or lateral slur on the tail. Usually, the slip occurs where the heaviest ink coverage causes the highest force of blanket release.

It is also possible to determine the unit where the slippage occurred. If the press sequence is K, C, M, Y and the slur or ghost image is only apparent in the black and cyan, then the gripper slip most likely occurred in the cyan unit. The last unit in rotation showing the slur or ghost image is the first unit that should be checked.

A methodical approach to trouble-shooting a gripper-slip problem would begin with checking the basic mechanics on press while minimizing high-force or inconsistent blanket release patterns.

## Causes

- Cold press start-up and/or cold operating conditions.
- Cold ink increases tack and the force of blanket release.
- Cold Paper.
- Insufficient gripper bite.

## Gripper Slip (continued)



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- Excessive impression squeeze.
- Dirty, worn, or misadjusted grippers, cams, or cam followers.
- Insufficient gripper spring or preload tension.
- Disproportionate ink coverage across the sheet; “checkerboard” layout.
- High ink tack or unit-to-unit ink tack build at the point of blanket release.
- High-force blanket release characteristics.
- Inadequate release agents in fountain solution mix.
- Dense, smooth-coated paper characteristics with low co-efficient of friction in conjunction with any of the above.

### Options and Solutions

#### PRESS CONSIDERATIONS

- Safely idle press to pre-warm for cold start-ups. Pressrooms in colder climates would greatly benefit by full-time climate-control to maintain optimum ambient operating temperature.
- A loose blanket can sometimes produce a similar slur pattern as gripper slip. Check blankets and uniformly re-torque to the proper spec.
- Insure that sheet-to-sheet running register is consistent and that the sheet is not bouncing at the head stops or side guide.
- Minimize impression squeeze as much as possible.
- Adjust head-stops or infeed to maximize gripper bite.
- Check the gripper bite impression across the lead edge of the sheet for tension and tension uniformity.
- Individually clean and lubricate each gripper in the problem unit(s).
- Inspect grippers and gripper pads for wear or impacted debris.
- Check for cam and/or cam follower wear.
- Check gripper spring or preload tension.
- Inspect the gripper shaft for end-play or bushing wear.
- Check sheet size for maximum gripper contact. If the sheet edge is only partially captured by a gripper, move the sheet off-center to gain full contact if layout permits.

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- If gripper slip continues as a pervasive problem, consult press manufacturer for repair or retro-fit. This may include new or upgraded grippers and pads, new cams and/or followers, gripper shaft bushings, or stronger spring tension.

#### **INK AND LAYOUT CONSIDERATIONS**

- Cold start-ups, long make-readies, or extended down time may adversely increase ink tack on the rollers. Keep rollers lubricated with a tack reducer to minimize ink tack build and high-force blanket release on start-up.
- Ink should be acclimated and controlled to optimum operating temperature. Consult with ink supplier.
- Certain disproportionate layouts or color sequences, in conjunction with high-force blanket release, may require lower tack inks. Layouts with checkerboard ink coverage or heavy ink coverage mid-sheet to tail can cause uneven, high-force blanket release challenging the grippers as the sheet snaps on and off impression.
- Insufficient ink film on the rollers can increase ink tack at the point of blanket release. Check for adequate ink film thickness on the rollers when desired ink density is achieved.
- To control variable ink tack at the point of blanket release, determine optimum dynamic ink train temperature and adjust chill-roll preset accordingly.
- Avoid running heavy coverage solids in first down units as ink tack builds may challenge blanket release through subsequent units of print.

#### **BLANKET CONSIDERATIONS**

- Different blanket surfaces vary with respect to mechanical and chemical release characteristics. For example, a smooth-surfaced blanket may produce an excessively high-force blanket release due to the greater contact area between the blanket and a characteristically smooth-surfaced substrate.
- Over-packing affects impression squeeze and ultimately blanket release. Be sure that over-bearer blanket height is within specification.
- Insure compatibility of blanket wash and blanket surface compound to resist swelling and tack increase.

#### **FOUNTAIN SOLUTION CONSIDERATIONS**

- Additives such as glycol in the alcohol substitute can increase lubrication and reduce the force of blanket release.
- Proper ink/water balance running at supplier-recommended pH/conductivity levels will help establish a consistent and less forceful blanket release pattern.

## Gripper Slip (continued)



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#### PAPER CONSIDERATIONS

- Cold paper may be a contributing factor in adversely building ink tack. Recommendations for proper conditioning and control are listed below under Pressroom Environment.
- A square or just over-square sheet size may lack gripper contact across the sheet while pulling full circumference around the cylinder on blanket release. Try a wider sheet size.
- A harder, gloss or velvet coated surface, which has a lower co-efficient of friction (more slippery), may have greater tendency to slip from weaker grippers. A smooth paper surface in conjunction with a smooth-surfaced blanket may challenge the grippers with high-force blanket release.
- Highly coated gloss and velvet papers are usually calendared, which not only creates a hard, smooth surface, but also increases sheet density. A smooth, dense, hard-surfaced sheet may not conform to a weak gripper bite as well as a more compressible, higher bulk, soft-surfaced sheet.

#### PRESSROOM ENVIRONMENT

- Monitor relative humidity and temperature. The ambient pressroom temperature and humidity may be too high or too low, affecting ink tack, blanket release, and paper strength/stability.
- Ideal pressroom climate is 45% (+/-5%) Rh at 72° (+/-5°) F for North America and 52% (+/-5%) at 21° C in Europe.
- Allow paper to acclimate to pressroom temperature.
  - Paper will acclimate in skid or carton packs. Do not open until going to press.
  - Paper acclimation time is relative to environmental extremes.
- Properly conditioned paper runs with a broader operating window on press.