PaperWise™

Smurfit-Stone
Board Sales Division

Your Paperboard Solutions Company

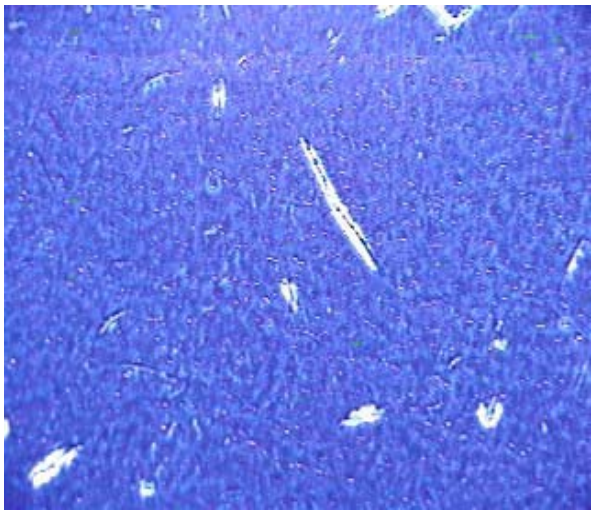
June 2004

The Dirt on Graphics

As direct print corrugated continues to strive toward higher-end graphics, stumbling blocks such as dust, dirt and debris become a bigger foe. Whether you are running full-coverage display or four-color process work, the battle is the same. Keeping dust, lint and debris out of the printed image is critical for success. Most often, the jobs are completed by stopping the press continually to wipe plates, which cuts into profitability and is extremely frustrating. In this edition of *Paperwise,* we will explain why dust is a growing headache for the corrugated industry and outline some techniques to **FTD - Fight the Dirt**!

Figure 1

Dust can adhere to the printing plate and wreck the appearance of uniform solid print.



Why Dust is a Growing Problem

Dust, dirt and debris are problems for all segments of the printing industry. However, those running higher graphics on corrugated are the most susceptible. There are several reasons for this, but no simple solutions. The fact that paper products are used creates an inherent amount of debris. It's just the nature of the beast.

Clean Facilities: As an industry, we haven't typically focused on the cleanliness of our facilities. It's now coming back to haunt us because expensive high graphics presses are still housed in the same warehouse-type facilities, and little attention is paid to the environment these presses operate in. Opportunities for dust abound…corrugator and die-cutting equipment often sit just a few yards away from the graphics press, coupled with a lack of consistent housekeeping.

Higher End Graphics: Some might say… "Hey, we've been printing on corrugated successfully for years and dust hasn't been that big of a deal. It seems to have gotten worse over the last few years." With the transition to higher graphics, corrugated isn't printed on the same type of press that ran typical brown boxes of 10 years ago. (If it is, the press has been dramatically rebuilt.) To achieve higher graphic images, the press uses a lower-volume anilox roll that transfers less ink and a more precisely-controlled ink film thickness to the substrate. Although this thinner ink film improves graphic capabilities, it also increases the likelihood that dust can be seen. Further complicating the dust issue is the fact that most graphics presses are now equipped with vacuum transfer which increases the airflow in the press and in the operating environment itself. With all of these factors, you can better understand how this evolution to high graphics can be a double-edged sword.

Fight the Dirt!

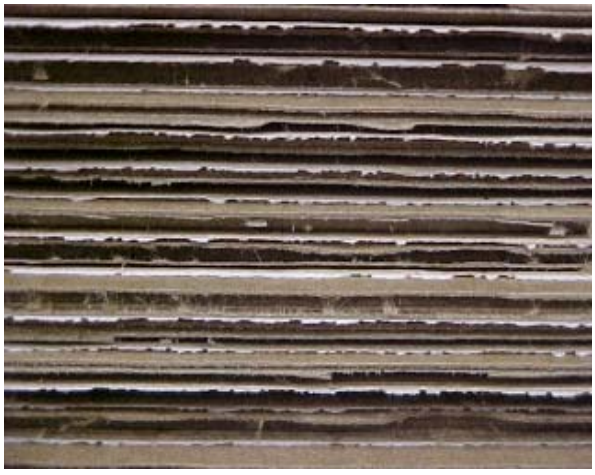
Initial FTD steps must look at all of the input variables, not the least of which is paper. Liners for graphics are typically white, ranging from white top, to solid bleached and coated. White liners are smoother, less porous and designed to resist dusting tendencies. Another integral part of the combined board is kraft liner which is typically rougher, more porous, and, therefore, can be a big source of fiber release. When selecting a single-face liner, it's important to choose one that is less likely to be a source of dust, since it comes in direct contact with the white liner sheet in the shingling and stacking process on the corrugator.

The next area of focus should be the corrugator. Making a concerted effort to reduce dirt and dust in the initial phases of board conversion can greatly reduce dusting. If a corrugator produced only graphics-grade combined board, there might be more control over dust. But, the reality is all types of combined board are needed by customers.

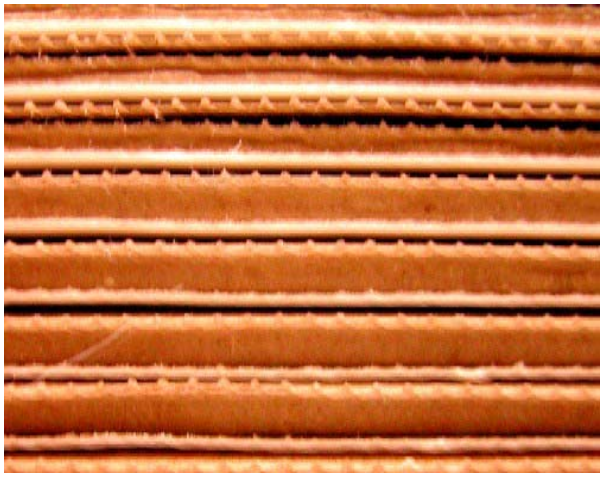
On the corrugator, the main areas of focus should be the slit and knife-cut edges of the sheets. Obviously, the sheets must be very cleanly cut for graphics. Another option is a sheet cleaner that can remove any unwanted dust or particles prior to final stacking. Two types are currently available: one that is placed after the slitters or another one that is placed after the cut-off knife. Below are more suggestions to help reduce the introduction of dust on the corrugator:

- Slitter knives should be high quality, durable and sharpened to OEM angles. Also maintain tight TIR (total indicated runout tolerances) of slitter blade shafts, collars and the blade edge itself, not just in machine direction, but in cross machine to prevent "wobble" or side-to- side movement.
- Use special care in the mating of the knives or knife and anvil; do not over tighten as this will induce "wobble."
    - Frequently clean slitter blades to remove any build up, such as adhesives that will concentrate abrasive forces to the print surface.
- For machines with automated sharpening stones, maintain and replace the stones at the correct angle. Keep edges properly lubricated.
- Tune the cut-off knife on a weekly using the same maintenance personnel each time. Then establish a preventative maintenance program to examine the blades for nicks.
- Alternate upper and lower knife sheet cut-off with take off operator and drive, so that one side of the knife does not become prematurely worn in one spot.
- The use of serrated cut-off knives can reduce "angel hairs" or loose edge debris. (See Figure 2)
- Clean the hot plates and be sure that they are level.
- Consider adding a sheet cleaner after the cut-off knife.

Figure 2



Straight knife cut-off



Serrated knife cut-off

As mentioned earlier, all segments of the printing industry struggle with dirt and dust. One key difference in offset printing is that the environment is often climate-controlled to provide optimum operating temperatures and humidity levels for inks, making it less likely that dust will become air borne. Also, dry conditions can cause static electricity which is an ally of dust and dirt. Although we are not recommending that you climate control your facility, it is an important factor in FTD. Let's do a quick comparison of other print processes to post-print flexo :

Figure 3

	Environment	Ink Film Thickness	Substrates	Sheet or Web Cleaning Equipment
Offset	Often climate controlled	.3 to .6 mils for spot colors	Often coated, very smooth, clean edges	No
Gravure	Sometimes climate controlled	.4 to .8 mils	Often coated, typically straight from mills	Yes
Pre-Print Flexo	Sometimes climate controlled	.15 to .35 mils	Often coated, typically straight from mills	Yes
Post Print Flexo	Rarely climate controlled	.15 to .35 mils	Corrugated sheets. Kraft to coated.	Seldom

**Ink film thickness values provided by Flint Ink.*

Based on the table above, a few differences stand out: environment and sheet-cleaning equipment.

As new post-print graphics presses come equipped with lower-volume aniloxes (6.0 bcm and below), vacuum transfer, and some with in-line die-cutting, FTD becomes inherently more difficult. Decreasing ink film thickness in a dust-laden environment doesn't help FTD efforts. Lower ink volumes allow smaller dust particles to be more visible, because there isn't enough volume to hide the dirt or remove it from the plate. Often volumes less than 6.0 bcm used for solid coverage print become more susceptible to showing dust and debris.

Large solid ink coverage jobs tend to show dust more than screen work, because screen work has less ink coverage and can better hide dusting issues. A dusty dot is a lot less noticeable to the eye than in a large solid coverage area. Just like a virus, you have to find solutions that kill all of the infection or it will come back! Now let's review steps that can help FTD:

Steps to Help With FTD

1. Analyze incoming press sheets, prior to printing.
    a. Check edges for loose fiber or debris. Often seen as a "ragged" cut.
    b. Lift first few sheets of stack and wipe print side of sheets with black cloth. After analyzing sheets over time a visual reference can be established for comparison of good vs. dusty sheets.
    c. Take a handful of sheets and jog them on the open flute edge over a face-up white sheet. This can help reveal loose particulate coming from the medium or flute channels. (See Figure 4)

Figure 4

Jogging sheets over white board.

2. Clean press room environment
    a. Consider adding climate-control equipment. If it's not feasible, at least consider humidifying units (in winter months) to help stabilize plant humidity.
    b. Eliminate static electricity! Don't just try to eliminate built up static electricity, rather create an environment in which it can not exist, e.g. climate-controlled.
    c. Filter plant air and machine exhausts.
    d. Evaluate on-press sheet cleaners that have static control options (check references from those who use them).
    e. Keep it clean.

3. Collaborative resources
    a. Talk with your vendors to help trouble shoot dusting issues. Suggest a FTD summit meeting with all of them. (Don't forget the equipment manufacturers.)

FTD Tips and Tricks

- For large solid coverage work, skip as many print stations as possible before the solid coverage station. (Often difficult when trying to die-cut in line).
- When running a large solid coverage image, use a screen plate (same ink color, say 20% tint) in a first down. This can help pick up and/or hide a lot of dust. Then run the solid coverage down next. (Note: It's important that you reevaluate your finished spot color as this step can darken or change the color as compared to a single bump of color.)
- Use a hickie picker plate. Run a screen or solid coverage plate in the first down with no ink. Use "kiss" impression. This can be set by setting impression on a previous ink color run in the first down. Set up minimum impression prior to washing the unit up, important to use the sheets that will be run for the up coming job. If you let your plate supplier know that you will be using a hickie picker plate, they can do less post-exposure on the plate to give it more tack than normal.

Keeping dust out of graphics is difficult, but not insurmountable. With some investigation you can determine the parameters of your process that are key to resolving it. If you find that the problem is more complicated, you don't have to fight the battle alone. Your suppliers have the benefit of experience and can help you Fight the Dirt!

If you would like more information on fighting the dirt in your facility, or other technical topics, contact your Smurfit-Stone Sales Manager or call us toll free at (877) 785-7835 or e-mail us at ***paperwise@smurfit.com.***