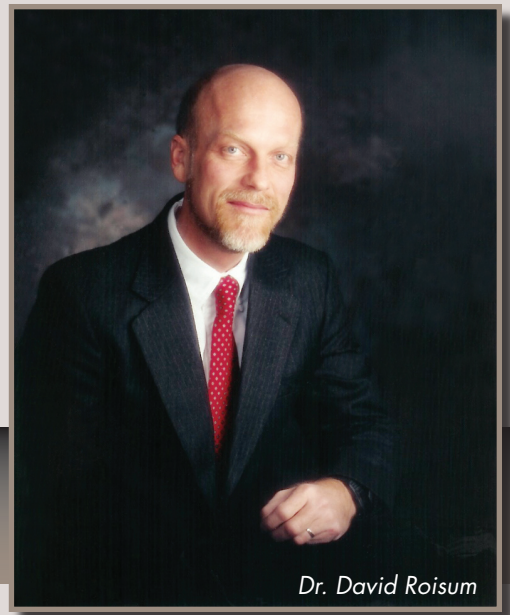


CRITICAL THINKING

by Dr. David Roisum



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How Can I Keep Rollers From Marking My Web?

The surfaces of some webs, especially those recently coated or printed, are so tender that they can't be touched by rollers until the surface is cured or dried. In these cases, the web is "floated" over a bar, pan or shoe. Floating a web is at best difficult and expensive. Floating can also cause environmental noise and difficulties in controlling web position and tension. Nonetheless, few options exist if the web can't be touched at all.

Identify the offenders

Some surfaces are more robust and can touch rollers, provided that you pay attention to the details of the contact. Unfortunately, creative product developers might give you sensitive formulations that might not run through all parts of an existing machine without marking. When marking happens, a three-step program is needed: identify the offending roller(s), identify the nature of the contact forces that cause the marking, and modify the contact.

Ideally, one should be able to point to the specific roller that is causing a specific mark. In some cases this is trivial because a scratch can emanate from a stopped idler. However, the offender is not always easy to identify because marks might be subtle, "skippy" or incomplete. Good machine lighting and a light booth are important tools for revealing slight marks. These marks should be highlighted with a pen. If a roller causes them, they will have a machine-direction repeat corresponding to the circumference of the offending roller.

If the roller is grooved or patterned, the pitch of the defect in the cross-machine direction will correspond to the pitch of the grooves. A "marking defect" book can be made up that lists each type of roller used in a machine, its location and geometry, and a tracing, if grooved. Matching a mark to a roller is much like matching an incomplete fingerprint. The match can be made with only tiny fragments of the pattern or with multiple patterns

if supplemented by computer analysis, such as a 2-D FFT (Fast Fourier Transformer). Once the type of roller is identified, the specific roller can be found by intermediate sampling or other techniques.

Tire tractor treads

There are three common types of contact that can cause markings. First, Z-direction pressure (through-thickness direction) can "emboss" the sheet, similar to making a footprint in wet concrete. The most likely sources of ZD pressure are nipped process rollers and winder lay-on rollers, though it is possible, in exceptional cases, to emboss over an idler roller. Second, the web can be marked by wide roller grooves (more than 10x caliper) or roller segments by either embossing as above or by stretching plastically into the grooves. Many films, foils and other delicate materials carry the "tractor tire" tread marks of idler grooving. Finally, the web can be marked by sliding over a roller that doesn't run precisely at web speed or by contact with some stationary object.

Since marking is often a classical time/temperature/pressure response, slow speeds will aggravate the severity. Thus, sampling on the top of a roll that slowed down at the end of winding will show more vivid marking than in the middle of a roll that was run at speed. Also, the marks might be more pronounced in areas where the caliper or tension profile is nonuniform and high. Use these opportunities to see a problem at a more subtle level.

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