



CASE STUDY

When Adhesives Stick Too Well “Synergistic” Coatings Keep Residues From “Gumming Up” Production Equipment

By Edmund V. Aversenti, Jr., General Magnaplate Corp.

If you work with calendar rolls, adhesive pumps, mixing kettles, mixer blades, rolls, rails, conveyors, frames, wheels, gears, dispensers, sealers, extruders, testers, applicators or a whole host of other components utilized in the manufacture and handling of adhesives - chances are very good that you know all too well the one universal truth of the adhesive formulator, manufacturer and applicator. That truth is this:

When adhesives come in contact with unprotected equipment surfaces, they do precisely what they're designed to do - they stick. And in the process they will gum up the best laid plans of production engineers.

The headaches are all too real and all too frequent:

Adhesive Residues on Winding Rolls Cause Downtime and Stubborn Clean-up Difficulties

Sonoco Products Company, an Indiana-based manufacturer of specialty packaging, faced costly snags in the seemingly straightforward manufacture of its fiber packaging forms. The process starts with the coating of a continuous web of fiber with a wet

adhesive. The web then goes through stainless steel metering rolls where it is chopped into sheets of prescribed lengths. The cut sheets are fed into a winding machine and precision rolled to create a ruggedly sturdy tube which is affixed to the inside corners of a carton. In the winding stage, however, transfer of the wet adhesive onto the stainless steel rolls created a host of stubborn clean-up difficulties. These, in turn, resulted in excessive and expensive downtime.

Voice Coils “Stuck” on Arbors Snag Speaker Production

For Pyle Industries, of Huntington, Indiana, production of voice coils is a crucial step in the production of the company's popular automobile sound systems. The coils are wound on a thin polyimide film laid on aluminum arbor forms, baked, and removed from the arbors. The process worked fine at first, but as the arbors were used and reused, the buildup of adhesive caused coils to stick to the arbors and resist removal. As time passed, greater and greater force was required, including use of a pneumatic cylinder ram to force the arbors off the coils. Production slowed and arbors were damaged. Many had to be replaced.



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Adhesive Residues Cause Idle Pumps to Seize Up

A pump manufacturer based in Illinois supplies a wide variety of specialty pumps to industrial plants across the country. The pumps are well designed and well built, and have an excellent operating history. One customer, though, ran into a serious problem using one of the company's pumps to meter adhesive in a filling operation. Everything was fine while metering, but when it stood idle between operations, adhesive left in the pump would set up around the shafts and prevent the pump from working when it came time to start up again. Hours of maintenance downtime cut into production efficiency and profitability.

A Long List of Adhesive Problems

The problems encountered in adhesive-related operations are almost endless. They include:

- A converter of industrial paper supply products who could not apply adhesives efficiently due to the uneven nature of the applicator roll surfaces.
- A manufacturer of photoresist adhesives whose stainless steel mixing kettles contaminated his product.
- The practically universal problem of adhesives sticking to mixing blades.
- Excessive wear and corrosion on both hot and cold rollers used in the textile industry to force carrier adhesives into fabrics.
- The lack of truly effective alternatives to such banned washdown solvents as MEK and acetone.

"Synergistic" Surface Enhancement Coatings Are An Ideal Solution

In our experience, the solution to these adhesive residue problems is often the application of what we call "synergistic" surface enhancement coatings. These coatings are created during multi-step processes that start with a series of specialized cleaning treatments and followed by enhancement of the metal substrate's surface through the deposition of an intermediate high-density film or by thermal spraying, depending on the coating.

The processes continue with controlled infusions of selected engineering polymers or other dry-lubricating particles. These particles are then mechanically cross-linked and locked in by a proprietary process and become a permanent, integral part of the newly enhanced surface layer.

The result is coatings whose overall characteristics surpass those of any one component used in the process. For this reason, these harder, more resistant, more slippery coatings are called "synergistic."

The Benefits of "Synergistic" Coatings

Because "synergistic" coatings are permanently dry lubricated, adhesive residues deposited during manufacturing and/or packaging either will not stick or can be easily removed. Production efficiency improves because more time can be devoted to making and applying adhesives and less time to cleaning up after them.



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The benefits of “synergistic” coatings can be dramatic:

- Sonoco Products Company had its winding rolls coated with an elastomeric polymer-based coating called LECTROFLUOR. Clean-up immediately became “quick and easy,” and costly equipment downtime has been virtually eliminated.
- Pyle Industries used the same coating and found that its voice coils “slid right off the arbors.” They reduced damage by at least 75% and doubled the number of coils separated from arbors in a given time period.
- The Illinois pump manufacturer had the shafts coated with a surface enhancement coating called NEDOX®. This has prevented the adhesive from setting up on the shafts - even after prolonged periods of idleness. They report that the maintenance hours saved are worthwhile, but nothing compares to the productive time and product saved by keeping the pumps pumping.
- The converter had its rolls coated with a plasma-spray coating called PLASMADIZE®, which not only reduced the sticking problem but reduced clean-up time by 50%.
- Other manufacturers have used “synergistic” surface enhancements to eliminate metallic contamination, combat sticking problems, eliminate wear and erosion problems, and substitute simple water washdowns for EPA-banned alternatives such as MEK and acetone.

The Slick Solution

Wise manufacturers and users of adhesives have learned to benefit by facing the “truth” I stated earlier: when adhesives contact unprotected equipment surfaces, they do precisely what they’re designed to do - they stick. But when you enhance the surface, your operations will be enhanced, too.



This Sonoco Products Company adhesive metering roll was treated with non-stick, Magnaplate-applied LECTROFLUOR®. Adhesive residues have been significantly minimized. Clean-up between runs is now simple and quick, without the use of harmful chemicals.