How is the Naval Aviation Depot, Cherry Point, NC, like Caesar's wife Calpurnia? "It must be above reproach!" Prior to 1984, the depot, which has one of the largest production facilities in the state, was doing business as usual, performing maintenance on combat aircraft, engines, and components. Wastes were pretreated at the depot, then released downstream to the Marine Corps Air Station for final treatment and discharge to local streams and adjacent shellfish waters. These activities were sanctioned under the National Pollutant Discharge Elimination System (NPDES).

In 1984, however, a new permit was issued by the state, with EPA having overview responsibility. North Carolina insisted on tighter parameters and began monitoring daily discharges. To meet these new requirements—especially with a phenol discharge limit of 1 ppm—drastic steps had to be taken.

Discharge records showed average daily phenol concentrations of 55 with a high of 150 ppm. An operations review immediately pointed a finger at the culprit—aircraft paint stripping. Routinely, all coatings were stripped from these craft before transfer to the overhaul and repair hangars. Stripping a metal-clad F-4-class aircraft required three to four 55-gal drums of strippers containing 20 to 25 percent phenol, or approximately 150 lb per drum.

**Options and Actions**

Technology was available to treat and reduce the phenol concentration of the wastewater to less than 2 ppm. However, one vendor estimated the cost of such a treatment system at $10 per lb of phenol. That translated to an overall approximate treatment cost of $1500/drum of stripping agent, which was purchased for $400/drum, but with no return—except, of course, that the depot would be allowed to stay in business.

**Plastic Blast**

Environmental regulations impact every area of surface finishing, including paint stripping. In this case, a re-evaluation of aircraft stripping needs and the use of plastic media blasting promise to satisfy anti-pollution rules and provide a cost savings as well.

—Dr. George E.F. Breuer, AESF technical specialist, Organic Finishing & Chemical Pre-treatment

Low-phenol-containing strippers that met depot specifications were available. But the depot was a victim of the system, having to purchase the cheapest product that could satisfy the specs. Although there were materials available that accomplished this and that did the job better, quicker, and safer, they simply cost too much.

An attack was therefore launched to identify alternatives. The goals and results were as follows:

1. Review and tighten specifications covering paint stripping processes and chemicals. This was time consuming because of the care required to ensure that changes which might adversely affect aircraft surfaces would not occur. With composite structures being introduced to the fleet, a new challenge was presented. The results, however, were good because some fly-by-night chemical manufacturers that had met the specifications no longer did. Consequently, quality products previously unobtainable now became available to the depot.

2. Seek and test available non-phenolic stripping agents that do not damage the aircraft and that perform efficiently without creating health hazards. Non-phenolic strippers (acid and non-acid) were proven satisfactory, meeting production requirements of time and cost and reducing the phenol concentration at point of waste treatment from the high of 150 to a daily average of less than 2 ppm. Specifications were prepared, and the depot moved into a new era of paint stripping.

3. Develop a program that would ultimately eliminate all chemical stripping. Existing technology to achieve this for aircraft surfaces did not meet Navy criteria. However, one of the most promising areas was an old tool with a new twist—plastic media blasting (PMB).

PMB was tested on a variety of metal and composite surfaces and a local engineering specification was developed. In the fall of 1986, the composite underside of an AV8B was stripped of its camouflage coating and suffered no material damages or structural weakening. The stripping was accomplished with personnel clad in protective clothing and ventilated hoods. Participants agreed that even in this relatively primitive environment, the work was accomplished quicker, more inexpensively, with no damage to surfaces, and with less of a health hazard.

The bottom line indicates that, although there will continue to be a need for some chemical stripping, approximately 80 to 85 percent can be eliminated by PMB. The projected annual production savings in labor and materials, coupled with those in waste treatment, have been conservatively estimated at over $1 million. It is forecast that the general costs of wastewater treatment will be reduced by $12,000 yearly and that the avoidance of phenols will result in a saving of $800,000. The cost of producing sludge cakes will be slashed to the tune of $20,000.

Engineering is now underway to retrofit an existing hangar (60 x 80 ft) into a blast booth that will accommodate fighter-class aircraft or heli-
WE WROTE THE BOOK ON BLACKENING

For starters send for these two Best Sellers!

MITCHELL-BRADFORD
Milford, Connecticut 06460
203-878-0671 • TELEX WUI 620813

Details: Circle 108 on postpaid reader service card.
copters for paint stripping. Four single-nozzle blasters will be used by operators equipped with conditioned hoods and trained in the use of PMB (Fig. 1). A payback period of less than two years is anticipated for the $1.5 million retrofit.

Policy Revision
Importantly, the criteria for stripping any aircraft before overhaul or repair were also scrutinized. A technical review board of diverse composition—from engineering to production to quality assurance people—now inspects every aircraft to determine if stripping is necessary prior to refinishing. Every effort is made not to strip, except when absolutely necessary, thus reducing solvent wastes in the simplest possible manner.

This new procedure has reduced by a full 50 percent the number of aircraft that would have been stripped routinely with phenolics in 1984. The remaining half are now being scuffed, sanded, overpainted, or partially painted. Incidentally, the use of plastic for blasting has been shown to triple daily production when compared to corncob media. Like Calpurnia, the depot at Cherry Point wants to be above reproach, whether EPA or the state is or is not looking.

---

**Fig. 1—Plastic media blasting will dramatically reduce need for phenolic paint stripping.**

---

**OUR RACKS STACK UP**

Custom designed racks and baskets for metal finishing.

**ABLE RACK**
St. Louis, MO
314-771-1377

**ACCURATE RACK**
Hamilton, OH
513-895-9100

**AMERICAN RACK**
Chicago, IL
312-276-2770

**NATIONAL RACK**
Paterson, NJ
201-684-0827

**SOUTHEASTERN RACK**
Vero Beach, FL
305-567-2262

**SOUTHWESTERN RACK**
Euless, TX
817-540-3800

**UNIVERSAL RACK**
Lewanon, TN
615-444-5802

**INDUSTRIAL RACK INC.**
Lynwood, CA
213-636-3898

---

**High PH **

SOLVENTS — CLEANERS — BRIGHTENERS
PLATING — PICKLING
ANODIZING — STRIPING

Can one tank liner material formulation handle all of the above operations satisfactorily and be cost effective? It’s doubtful! At Witt Associates you can choose a material with a formulation tailored toward your requirements.

To help you select the best material for the job, our liners are sold through knowledgeable, experienced distributors.

For the name of your local distributor, just dial 1-800-323-3335. We’ll have him heading your way in a jiffy!

If you need a liner in a hurry, the same phone number can have a liner on its way to you in one or two days at no additional charge.

**F. C. WITT ASSOCIATES LTD.**
P.O. Box 128, Coal City, IL 60416
815/634-8567
Outside Illinois Call 800/323-3335

---

Details: Circle 155 on postpaid reader service card.
agitation), creative anode placement, new tank configurations, and lower average current densities for longer plating times.

All of the above work, but often only to a limited degree. There is a resurgence in current modulation techniques like pulse and periodic-reverse-current plating. The premise upon which these tools work is the reduction or elimination of cathodic polarization layers, variations in electrical fields, or both. If such concepts are effective, the future will be very bright. However, their viability remains to be established in circuit manufacture.

**WHAT'S NEW IN SURFACE FINISHING?**
Continued from page 14

ions made the deposition potential of silver and palladium more noble, and increased the limiting current density. The palladium content of the alloy increased with arsenic and palladium in solution and decreased with rising temperature. Alloys with less than 10 percent palladium had smooth, fine surfaces. The grains became globular as the current density increased.

Growth Morphology of Hard Gold Electrodeposits. S. Nakahara, Cryst. Growth, 75, 2, 212 (1986). Rounded, mound growth formations of gold were observed under a number of deposition conditions. The mounds were very small (200 angstroms) and incorporated many non-metallic molecules. The mounds were bonded to the (111) planes.

**THINK TANK**
Continued from page 18

we noticed a 10-fold increase in resistivity. What is your opinion of this phenomenon?

A: The increase in resistivity probably was a consequence of film dehydration during storage. Such an increase might be prevented by keeping the filmed parts in a humid atmosphere.

---

**FREE MULTICLAMP**

Being first in worldwide sales proves that MoldSaver has the best clamp around. Give our FREE sample a try. All you have to do is call. Even that's free!

- 4 Sizes in Stock
- Strongest & Longest Life Clamp
- Plain, Ceramic & Titanium Tips

FOR FREE CLAMP AND BROCHURE CALL:
1-800-327-2742

---

**MOLD$AVER**
MASTER PLASTICS

345 W. 75th Place
Miami, FL 33014
Phone: (305) 556-8810
A DIVISION OF SAVEL PLASTICS, INC.

---

**ADVICE & COUNSEL**
Continued from page 22

the method of disposal (e.g., incineration, hauling or reclamation), and (3) spill prevention.

If, however, the Control Authority samples and analyzes the company's waste stream to confirm compliance with a TTO standard and the results show non-compliance, it can require that the facility initiate TTO sampling and analysis on an established frequency. The Control Authority will also require that the discharger take remedial action to comply with the standard as expeditiously as possible.

Following the initial analysis, the regulatory agency probably will require the company to test only for those organics that were found in the sample. Testing for one or two organics is far less expensive than a full TTO analysis.

Next time, we'll talk about the procedures and costs of analyzing for TTO.