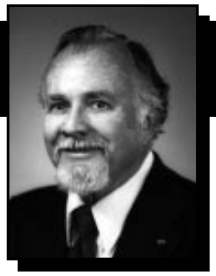

Pretreatment & Organic Finishing

R.W. Phillips Jr. (Left) • MarRich Associates
P.O. Box 3072 • Lynchburg, VA 24503

R.W. Phillips III • Brent America, Inc. • Arlington, TN

Who Cares?

One of the best lessons I have learned in life is this: *People do not care how much you know until they know how much you care*. I don't know where this statement originated, but my father drilled it into me about 60 years back. I only wish I had incorporated it earlier into my daily philosophy.

There is no doubt that we—as a nation, as a company, as individuals and as teams—are becoming highly specialized in almost every field of endeavor. Individuality and specialization are trends that seem to be both our strengths and our weaknesses in management, education, science, labor, productivity, government, society and family. We are all attempting to do more—individually and professionally—to widen our viewpoints and determine how we can accomplish more with less. We are attempting to create, accomplish goals, and find new ways to make all of our professions better.

The metal finishing "profession" has faced many challenges from regulatory and economic activity. To me, this has meant that we *do care*. Maybe not for everything or everybody, but for finding new and better ways to respond to all of the challenges.

Reducing Rinsewaters In Metal Finishing

One challenge has been the desire and the demand to reduce rinsewaters in cleaning and preparation for metal finishing. Initial inclinations were to simply turn down the valves to reduce the volume, but this meant that there would be more contamination. It was necessary, therefore, to find ways to reduce the water flows and improve the rinsing quality. How was this accomplished?

In the late 1970s, the use of counterflow rinsing became a reality. Studies showed that if tanks or stages were added to the rinse sections, there would be a reduction in water flow, and some of the contaminated water could be used as makeup for the cleaner, pickle, phosphate, etc. The problem was finding available space for a new seven-stage washer (clean, rinse, rinse, phosphate, rinse, rinse and seal) to replace the standard five-stage washer (clean, rinse, phosphate, rinse and seal).

It appears that we have finally found a way to decrease the water flow, improve the quality of water in rinsing, and recycle to nearly close the loop to a zero discharge. There will still be sludge, particulates, oils and other soils that must be disposed as waste, but the amount will be decreased. This reduction of contaminant levels, neutralization and filtration is a lot of work—and must be accomplished in a small space, quickly and economically.

A typical system requires the use of fresh or treated water as the final mist rinse after the phosphate rinses. This water counterflows into the tank and the pre-rinse riser as parts enter the rinse stage. The water will be transferred through an "equalization and neutralization" tank and filtered up to the post-rinse shower after the cleaning rinse cycles. The water in the pre-rinse shower (at the rinse stage entrance) will be recycled through a combination of chemical treatment and membrane and/or sandbed filtering. After phosphating, the water will be returned to the post-rinse stage.

The keys to making a counterflow system work are *ozonation and sandbed filtration* of the rinsewater stages. High-velocity injection of ozone into the rinsewaters helps lower the presence of organics and dissolved solids. Ozone will reduce organic loading by literally oxidizing organics, such as surfactants and residual oils. It will also reduce the dissolved-solids content by removing those metals that form insoluble oxides (sodium, iron and, to a lesser degree, zinc, copper and aluminum).

The accompanying chart shows what one operation accomplished after installing a counterflow system, including ozonation with filtration. While these figures may not be astounding and may leave you with questions about ozonation, please notice that there was a 4:1 reduction in rinsewater volumes. We also found that there was *zero* loss of underpaint corrosion resistance in salt spray testing. Tests are currently being conducted using ozonation in the final rinse seal without chemicals, and are showing an improvement of salt spray corrosion resistance over chemical seals.

So, because we say we care, we must look at ways to help each other reduce the volumes of water used, discharged or treated. No single technology has all the answers, but by combining our efforts and using tested technologies, we just might find that we all *do* care. ❑

Monitored Contaminant	Stage 2 (Before counterflow)	Stage 2 (After counterflow)	Stage 2 (After ozone)
Organic loading	<100 ppm	>650 ppm	<150 ppm
Dissolved solids	450 ppm	>1250 ppm	<750 ppm
Solution pH	5.5	7	7
Suspended solids	<100 ppm	>200 ppm	>180 ppm