



### Duo-Fast Corporation: Minding the Metals

(Reprinted from INDUSTRIAL WASTEWATER magazine.)

Duo-Fast Corp. is a leading designer, manufacturer, and marketer of power-driven fasteners and the power tools used to apply them. At their fastener plant in Cleveland, Mississippi, the new nails and staples fabricated from millions of pounds of raw steel rod each year leave about 25 million gallons of wastewater in their wake.

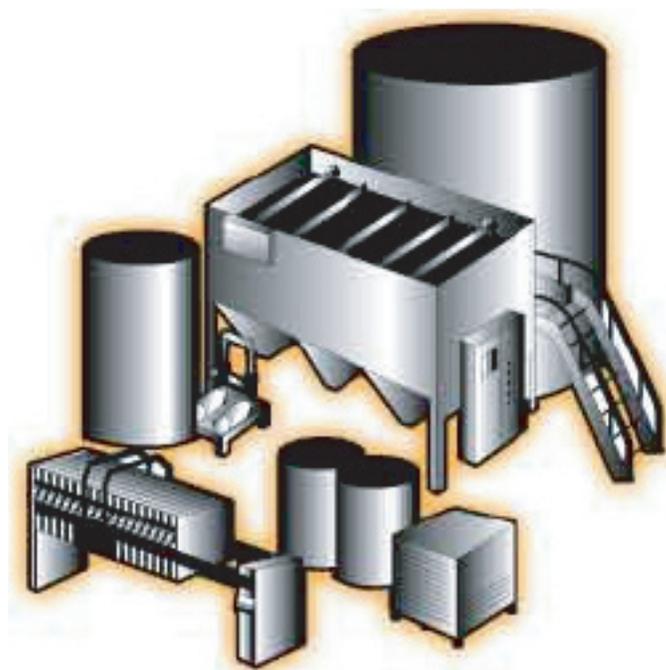
Working closely with the Duo-Fast's environmental coordinators and consultants, technicians from Beckart Environmental, Inc. installed a new wastewater treatment system as the walls and roof of a new plant addition went up around it. Today, the facility is a showcase for both state-of-the-art treatment equipment and Duo-Fast's own chemical engineering capabilities, which include proprietary coatings and other process innovations widely recognized in their industry, and which were successfully applied to the treatment approach.

The primary focus was on process wastewater from electrocleaning, zinc electrogalvanizing, and nail cleaning operations. Rinsewater from the cleaning and galvanizing areas (generated at a rate of 20,000 - 30,000 gallons per day) were examined separately from those of the Ransohoff nail-cleaning operation (rate of 20,000 - 30,000 gallons per day per line), which is a more concentrated stream of dissolved heavy metals, oils, and grease (rate of 1,700 gallons per week).

The variable streams evaluated were that that collectively discharged through plant outfalls for total copper content. Copper has a local permit limitation of 0.237 lbs. per day as a daily average, and 0.356 lbs. per day as a daily maximum. Discharge limitations based upon a 24-hour composite sample are further required. With independent confirmation of favorable pilot stage results establishing reduction levels of 0.02 ppm copper, and the fact that the compacted sludge for a good, dry cake, Duo-Fast elected to commit to a highly advanced, automatic continuous treatment system rated to process 130,000 gallons per day.

The system meters in and blends the concentrated waste with other streams in a large equalization tank sized for optimum sample stability. Due to the size and complexity of the process, Beckart provided a comprehensive programmable logic controller (PLC) system. Major functions of the PLC include pH monitoring throughout the various treatment steps, automatic polymer blending, metering, and pumping systems, control of feed modules for polymer and lime, and wastewater transfer rates among the reaction and mix tank, clarifier, and filter press. The PLC is also equipped with a telecommunications module which can communicate directly with Beckart headquarters in the event of needed adjustment as flows, waste stream composition and other factors vary.

In the dish-bottom reaction and mix tank, a floc is created by a combination of coagulants, polymers, and induced air flotation. By principles of Van Der Waals force, the contaminants attach to micro-



bubbles and rise to the surface. The clarifier, currently processing 70-80 gallons per minute, skims off the accumulated sludge and transfers it to a holding tank, while the treated water is routed for discharge.

Sludge transfer to the 18 cu. ft. Hy-Pack recessed plate filter press is the final step in the process. The press is currently emptied once every other day, and is expandable as future needs dictate. The filter cake meets Toxic Characterization Leaching Procedure (TCLP) standards as non-hazardous solid waste, and is locally landfillable. Duo-Fast also opted for a complete monitoring system on the back end, including composting sampler, pH meter, and flume. The multiplicity of checks, balances, and sample points for evaluation has minimized system upsets and provided complete flexibility to fine-tune to Duo-Fast's priorities.

Operator time is minimal, consisting primarily of morning control settings for the day's treatment process, and cake dumping on a daily basis. With a hopper-bottom design to the clarifier, clean-out is thoroughly and efficiently accomplished on a weekly basis.

A company spokesman summed up the installation effort and results this way: "Our firm wants to be a leader in environmental responsibility and commitment, and we are extremely pleased with this system. Beckart provided excellent service on a very tight deadline. The treatment system has proven a sound business investment, as well. With the ability to satisfactorily handle increased volumes, we've already expanded to three Ransohoff lines, dramatically reduced our use of solvents in the nail-making operation and their attendant disposal costs, and we feel adequately prepared for any future discharge or plant process changes."