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PROGRAM

Soak step reduces solvent waste from cleaning paint straining equipment

CASE STUDY

Company	Crenlo Inc., Rochester, Minnesota
Product/Industry	Manufacturer of cabs for agricultural and construction equipment, electronic cabinets and enclosures, and NEMA electrical enclosures.
Waste stream/chemical	Flammable solvent containing Toluene, MEK, and similar solvents.
Process	Cleaning paint straining/filtering equipment used to prepare paints for spray application.
Change	Equipment was soaked in solvent prior to spray rinsing.
Cost	$110 for supplies and less than $150 for labor.
Savings/other benefits	Solvent waste was reduced by about 55% or 1,700 gallons/year beginning in late 1990; savings on solvent purchase and disposal is about $2,000/year. The soak also gave more flexibility in the timing of some cleaning operations.

Background

Crenlo, Inc. manufactures metal products from steel and aluminum. Finished products are coated with baked enamel paint, and most paint colors are prepared on-site. Paint from any prepared batch may be stored for future use before it is completely consumed. Therefore, the paint is remixed and strained to remove solids larger than roughly 90 mesh screen size before delivery to the spray booths.

Before the change over, the straining equipment was cleaned using fresh solvent sprayed from a hose fitted with a nozzle. The strainer consisted of a dairy funnel draped with a double layer of nylon tricot fabric. The fabric was held onto the funnel with masking tape and replaced weekly. Annual cleaning of the straining equipment

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produced about 14,000 gallons of waste costing at least $16,000 per year. The clean-up solvent is a recycled blend that is distilled off-site and returned to Crenlo for reuse.

Waste reduction technique

An EPA[1] funded waste assessment identified the cleaning of the paint straining equipment as a major source of solvent waste at Crenlo (27% of the plant total). One idea to reduce this waste was to search for other materials that would clean easier than the nylon. This search led to the fabrication of a new straining funnel made from brass screen soldered to a steel rim. Tests eventually showed that the brass screen funnel was no easier to clean than the nylon. However, because of the permanent solder construction of the brass screen funnel, the operators decided to soak the screen with other equipment in a solvent filled drum before rinsing it with a clean solvent spray.

This soak procedure allows dirty solvent to remove, or at least thin, the paint coating the brass screen making it easier to rinse off any remaining paint. With the new brass screen funnel and the soak procedure, spray cleaning times were reduced from 30 seconds to approximately 10 seconds, with a corresponding decrease in solvent waste. The equipment soak tank was changed more often but this increase in waste was not quantified. A significant reason for introducing the soak procedure was that it added flexibility; instead of cleaning the straining fabric immediately, before the paint dried, the soak procedure allowed for cleaning the brass screen funnel as time allowed.

Implementation problems

1. Soaking the brass screen funnel with paint mixing equipment, like drum mixers and dip sticks, occasionally caused tears in the brass screen. Depending on the general screen condition, repairs could be made in a few hours to a few days for minor problems, or up to a month or more to construct a new funnel. Because of the length of time needed to make a new funnel, it was quicker to revert to the old funnel design to meet immediate needs rather than submit a rush order to maintenance. It then became difficult to justify the time to order repairs or a new brass screen funnel as long as current paint needs were being met. Reverting to the old funnel also eliminated the possibility of paint line down time. The solution to the tearing problem was to purchase an eight gallon, Justrite@ wash tank and a stand from Lab Safety Supply, Inc. (800/356-2855) in which to separately soak the funnel. The solvent in this tank is changed weekly, creating a new 350- gallon/year waste stream.

2. Fabricating the brass screen funnel required shaping the wire cloth, soldering the seam, and soldering the rim to the funnel. Since the paint vault operators could no longer fabricate their own funnels when needed (for example, in case of a bad tear or the build up of paint resulting in slow filtering) there was the tendency to revert to the nylon funnel design when there was a problem. Thus, for the same reasons as in problem one, it occasionally took four to six weeks before a new brass screen funnel was made and brought into service. Once it

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was clear that the soak procedure and not the filter material (nylon or brass) was responsible for the waste reduction, vault operators determined that a large hose clamp could be used to attach the nylon fabric to the original funnel instead of masking tape. This change gave vault operators control over the fabrication of the straining funnel and also allowed the nylon straining fabric to be soaked. Thus, the soak procedure became fully implemented and used to clean the nylon fabric and the brass screen funnel.

Economic Benefit

Another waste reduction technique (changing nozzle size) that reduced the funnel wash waste from 14,000 gallons/year to 3,000 gallons/year was implemented before the soak procedure came fully on-line. The soak procedure reduced the spray rinsing waste further by about 70% or 2,000 gallons/year, but created a new soak waste of approximately 300 gallons/year. The net waste reduction of 1,700 gallons/year should save Crenlo $2,000/year. (Note: If the soak procedure had been implemented first, it is believed the net waste reduction would have been 9,500 gallons/year.)

There was no capital investment. Supplies consisted of a wash tank and stand which cost $110. The time required by Crenlo personnel to develop and implement the soak procedure initially, and the time later required to modify the strainer design was minimal. Tests for evaluating the soak procedure required two to four hours. Therefore, total labor cost is estimated at less than $150. Total implementation cost was less than $250.

Implication/Application to other Companies

Presoaking or any other form of multi-stage cleaning can significantly reduce wastes associated with cleaning dirty parts or equipment. Dirty solvent (or other cleaner) removes most of the soil, while clean solvent brings the parts to specification. Multi-stage cleaning can be accomplished with immersion, sprays, or a combination of both. Ideally, the “clean” (second stage) solvent will be reused directly as dirty (first stage) solvent after it picks up too much soil.

In addition, this case study illustrates that it may take a few attempts to achieve a workable waste reduction solution. Thus, it is worthwhile to focus attention on a problem that will involve many people in generating ideas for waste reduction. It is also worthwhile to try potential solutions that have low-cost implementation requirements. Trying low-cost ideas helps people to understand the waste reduction process better, and may generate new ideas that lead to a workable, costeffective solution.

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