Reel Problems

Frank Altmayer, MSF, AESF Fellow
AESF Foundation Technical Education Director
Scientific Control Labs, Inc.
3158 Kolin Ave., Chicago, IL 60623-4889
E-mail: faltmayer@sclweb.com

Dear Advice & Counsel,
We have operated a reel-to-reel plating operation for many years. Over the past ten years, we have seen a heavy turnover in management and now our line is operated under less than ideal conditions.

I am the latest manager faced with the task of improving product quality and productivity. I have a number of issues that I'd like to relate and get your comments/recommendations on:

Problems with the Equipment

1. **We would like to reduce high temperatures and humidity levels within the area.**

2. **Chemical solution is drawn up into the hoods. Hoods and vents are hard to clean out. They become packed with chemical residues which reduce overall air flow.**

3. **We need a new design on tank covers to aid in minimizing heat and moisture into the current environment and to keep the baths free of contaminants. Our existing covers have been warped with heat and age.**

4. **The location of filters and pumps on tanks are in locations that are difficult to access (most of these are behind the line amidst piping, etc.).**

5. **We have issues with associates filling tanks and leaving hoses in the tanks causing tanks to overflow and fill up the containment pits.**

Line Speed
We need a 5% increase in production each year. What specific actions can be taken to increase plating speed?

Please help.

Signed,
Reely Needu

Dear Mr. Needu,
You have provided me with enough issues to take up more than one article, so let's begin with your ventilation system. I paid a visit to your facility and made the following observations:

High Temperatures and Humidity

This condition is caused by the poorly designed ventilation system currently employed. The shortcomings are:

1. The exhaust slots are located above the tank lids, but most all of the lids are warped. Mist, sprays and foam are drawn into the duct from under the lid on the backside of the tank, clogging the ductwork and reducing exhaust rates. Any fumes or escaping water vapor that leaves from the front of the lid is not captured, as the exhaust hood only draws from the backside to the lids (See Photo 1).

2. The tanks covers are warped due to the close proximity between the hot liquids and the lids (See Photo 2).

3. The sump tanks are not exhausted and are uncovered.

4. The tank covers physically block the exhaust duct from properly ventilating the process.

Since replacing the entire ventilation systems and plating tanks is an expensive proposition we recommend that you consider modifying the ventilation system by adding artificial "freeboard" to the existing tanks. This can be accomplished by welding additional polypropylene onto the tops of the existing tanks as shown in the illustration in Photo 3.

While more costly, an over-all more effective recommendation would be to replace all process plating tanks and the entire exhaust system with new more modern technology. An example of a modern ventilated sump featuring in-tank filtration is shown in Photo 4.

The tank sumps need to have covers and exhaust ducts installed. These covers should be hinged so that they can not be totally removed. Water/chemical-proof switches can be installed to sound an alarm if a cover is not in place.

Location of Filters and Pumps

Your sump tanks and filters are in locations that are difficult to access (most of these are behind the line amidst piping, etc.). The options for curing this issue include installing new sumps as per our above recommendation, or you can look into installing in-sump filters that take up less space.

Overflowed Sumps

This can be corrected by the installation of level switches and a solenoid controlled water addition system that would automatically keep each sump at a pre-determined level. An alternate system would sound an alarm when the level reached a low-low set point, allowing the worker to press a button to add the water, which then would automatically shut off when the correct level was reached.

Next month we will deal with plating speed. *P&SF*

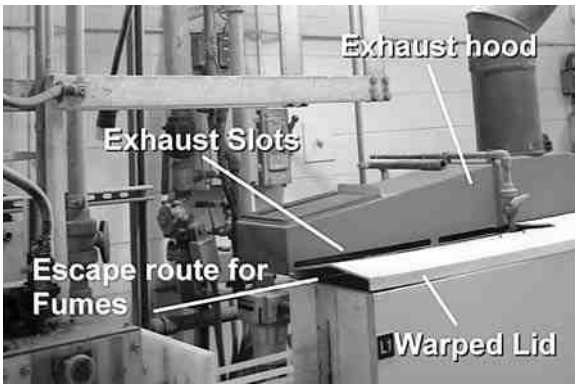

Photo 1.

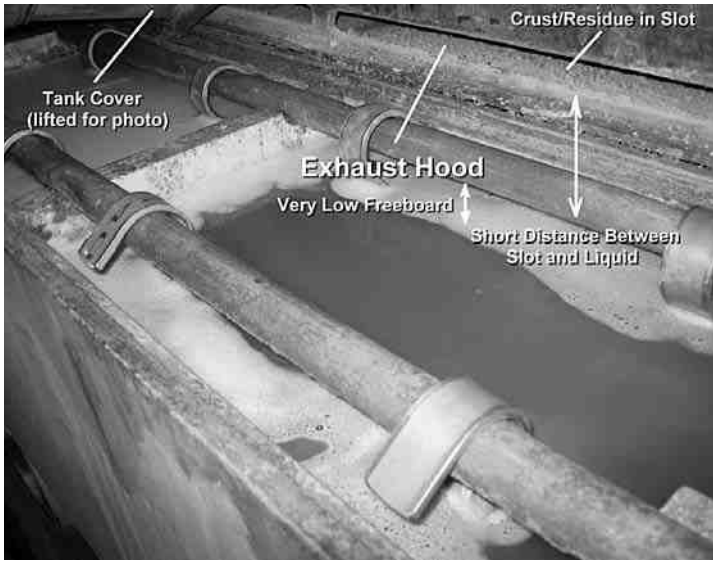

Photo 2.

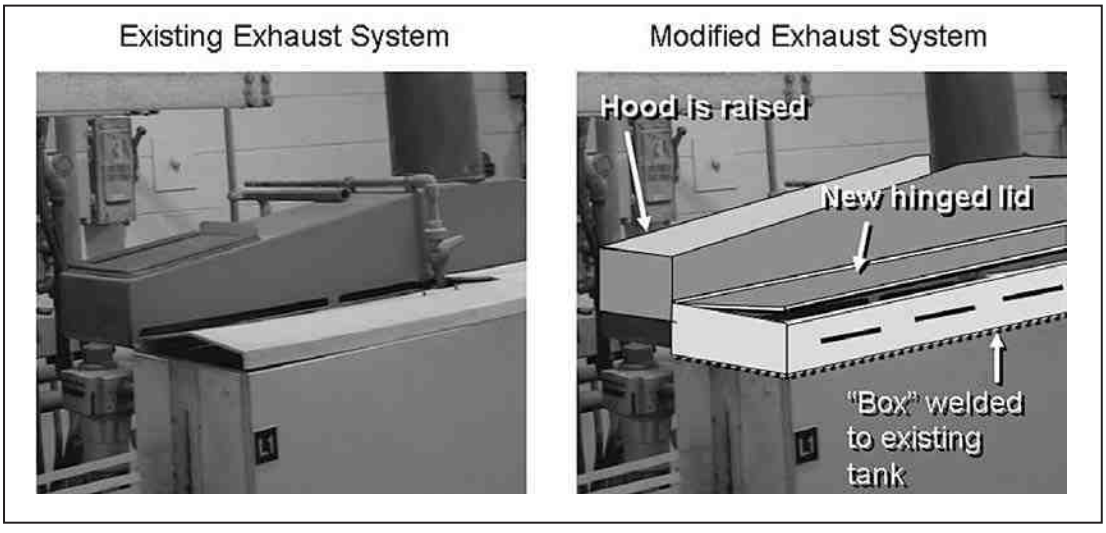

Photo 3

1. Polypropylene "box" is welded onto existing tank, creating "artificial" freeboard.
2. Existing hood is raised 34".
3. Slots are encased by box and are 34" higher up from solution top.
4. New hinged lids replace loose old lids.
5. Narrow slots in front of box allow air to flow into and over process solution and into hood slots, providing complete ventilation from all sides.

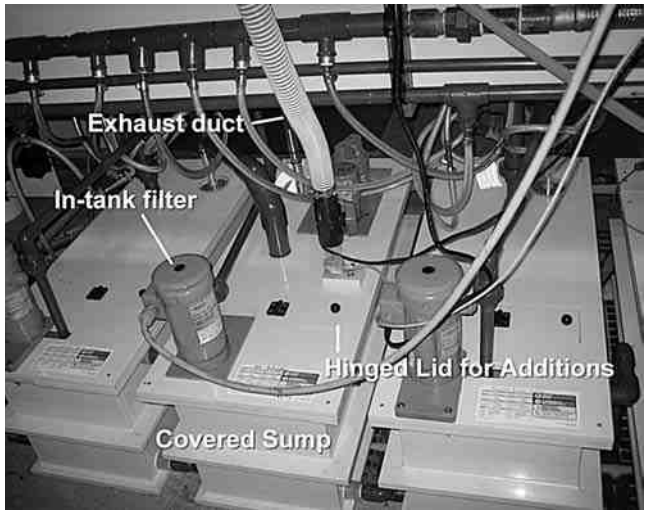

Photo 4.