Honors Research Project
CHEE 497

Architectural Paint Tank Cleaning
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Executive Summary

Due to the chemical composition of water based architectural paint, it is highly susceptible to bacterial growth and challenging to clean once dried to a surface. When the paint dries on equipment surfaces, it creates an environment where bacteria can grow. This buildup of bacteria can lead to contaminated and spoiled batches. Cleaning tanks down to a metal clean is important because it reduces the ability of bacteria to grow, thus preventing batches from spoiling. However, with increased regulations on the use of material preservative ingredients and no established best practice on how to clean, cleaning has become a difficult practice that varies from site to site. Additionally, there are multiple variables such as cost, downtime, water and biocide usage, tank configuration, and materials of construction that have made it difficult to standardize the best cleaning practice.

The scope of the project was limited to cleaning thin down tanks used for water based architectural paint. As cleaning methods vary throughout the architectural region, this project identified current cleaning processes. Additionally, outside vendors and products were considered to create a recommendation. This project also explored the pros and cons of each method and identified an efficient way to clean that reduced the amount of manual work, cost, and downtime.

This project was carried out by interviewing architectural sites to determine current cleaning methods. This also allowed for the ability to learn about challenges with cleaning, if they were ongoing or not, and how they were overcome. Research was also done on outside vendors and products, including new technology or products that may or may not be used at other sites within the company.

There were three main types of cleaning: 1. tank rinsing – done with water between batches, 2. tank washing – a long wash with a sanitization agent, and 3. metal clean – a longer vigorous activity to clean to tank to bare metal. There were also common cleaning trends around the cleaning methods, products, and tank set up. When comparing the material of construction of the tanks, stainless steel tanks were easier to clean compared to carbon steel tanks coated with epoxy. Additionally, cylindrical tanks were easier to clean than square tanks. Tanks used with consistent volume that are used frequently were also easier to clean. On the other hand, tanks used for colored and texture products were more difficult to clean and required more frequent cleaning.

Similarly, a challenge that emerged when cleaning involved cleaning tanks with color and texture batches. One way to improve this was to have a dedicated tank for texture products, thus only one tank required a stricter cleaning schedule. Another struggle included cleaning with hoses, as water pressure is often inconsistent throughout the plant and only able to wash with cold water. One site had a challenge with humidity, as higher humidity increased bacterial growth. However, the site increased the frequency of conducting hygiene tests to indicate when to clean leading to less failures.

There is not one single variable that constitutes the best cleaning method, but rather a combination of the following. Equipment should be designed so that it is efficient to clean, by referring to the 3-A Sanitary Standards. Additionally, equipment can be cleaned using multiple methods, such as spray balls or clean in place technology, but the cleaning equipment must be kept in good condition through regularly scheduled preventative maintenance. Finally, every site should have its own set of stand operating procedures, train on proper procedures, and periodically verify the effectiveness.