DIRECT ASSISTANCE PROGRAM

CASE STUDY

NYSP2I Supports Optimax with Reducing the Costs & Hazards of Single Stream Grinding Waste

Optimax Systems Inc. (Optimax) is a company located in Ontario, NY that produces prototype, high-quality optical lenses for a variety of industries. Employing nearly 300 people, Optimax serves customers including the National Aeronautics and Space Administration (NASA), making lenses of all kinds including those with complex geometries such as aspheres, cylinders, domes, freeforms, prisms, and spheres.

CHALLENGE

Optimax begins its production processes with solid slabs of glass called (ingots), which are carefully machined using precision grinding and computer control. Grinding processes inherently create excess glass particulate that mixes with cutting coolants as a natural consequence of the process. After cutting, spent coolant solutions from each grinding area are collected and handled as waste.

In order to achieve specific optical properties in some of its lenses, Optimax currently uses glass ingot feedstocks that contain certain levels of lead (Pb) in some of the processes. As a result of the lens grinding operations, lead particulates are broken down from the glass and dissolved into the coolant solution, causing the spent solution to become hazardous waste. All Optimax wastes (hazardous and non-hazardous) are collected and mixed together as a single waste stream.

For Optimax, there are significant costs related to hazardous waste disposal and the labor associated with the management of the hazardous waste. In order to address these issues in pursuit of cost savings, environmental benefits, and efficiency gains, the New York State Pollution Prevention Institute (NYSP2I) at Rochester Institute of Technology (RIT) worked with Optimax to evaluate opportunities to reduce the amount of hazardous waste generated by lens grinding operations.

SOLUTION

In order to determine whether waste segregation – separation of hazardous waste from non-hazardous waste – was possible to reduce disposal costs and liabilities, process mapping was performed of the entire facility. This exercise revealed that segregation of leaded and non-leaded glass grinding waste would not be feasible due to the unique nature of parts flow in the facility. Such segregation would require an entirely separate waste treatment area to properly manage the two different waste streams, making this option both cost-prohibitive and relatively impractical, given the company's size. Instead, NYSP2I engineers researched improved onsite waste handling methods and technologies to reduce waste and costs.

Centrifuge (www.bazell.com)

The first of the highlighted solutions was improving centrifugation of the single waste stream. NYSP2I ran tests on the

CHALLENGE

- Optimax needed support with the evaluation of opportunities in order to reduce their hazardous waste generated by lens grinding operations

SOLUTION

- NYSP2I ran tests on the waste solution using a high-speed centrifuge and determined that centrifugal forces 1,700 times that of gravity (1,700 Gs) could effectively separate out solids, producing a dewatered sludge
- NYSP2I tested both microfiltration (where membrane pores remove particles between 0.1 and 10 micrometers in diameter) and ultrafiltration (where pores remove particles between 0.001 and 0.1 micrometers). The testing revealed that ultrafiltration would be a more effective solution to concentrate the waste and produce clean water

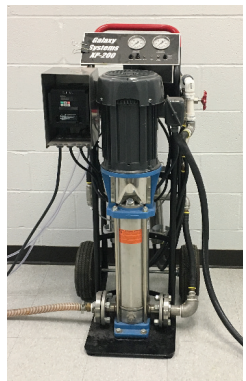
RESULTS

- NYSP2I engineers worked with Optimax to design a system that incorporates both centrifugation and ultrafiltration to more effectively separate clean water from the spent coolants while simultaneously reducing the amount of labor that must be allocated to waste management
- Projected labor savings of up to 50% are anticipated, which translates to approximately $30,000 per year of cost savings

OPTIMAX®

waste solution using a high-speed centrifuge and determined that centrifugal forces 1,700 times that of gravity (1,700 Gs) could effectively separate out solids, producing a dewatered sludge. Removing the water content can thus accordingly reduce the amount of the hazardous waste by up to 60-percent.

Membrane filtration was investigated as another possible means to improve waste management at Optimax. The NYSP2I team tested both microfiltration (where membrane pores remove particles between 0.1 and 10 micrometers in diameter) and ultrafiltration (where pores remove particles between 0.001 and 0.1 micrometers). The testing revealed that ultrafiltration would be a more effective solution to concentrate the waste and produce clean water. As a result, ultrafiltration was able to concentrate the oily components of the waste solution by 96%.



Membrane System

RESULTS

Although waste segregation was not deemed practical to reduce amounts of hazardous waste, improved management schemes to reduce costs associated with the resulting waste were identified through use of centrifugation and membrane filtration. Utilization of these technologies would also provide opportunities to simplify the entire waste management program, produce clean water and reduce costs as related to labor.

To this end, NYSP2I engineers worked with Optimax to design a system that incorporates both centrifugation and ultrafiltration to more effectively separate clean water from the spent coolants while simultaneously reducing the amount of labor that must be allocated to waste management. Projected labor savings of up to 50% are anticipated, which translates to approximately $30,000 per year of cost savings. Based on costs of equipment (centrifuge, membrane system, tanks, etc.), the projected payback to implement the new system is less than one year.

TESTIMONIAL

"After working with NYSP2I, we have been able to better identify our waste stream and more effectively process it. NYSP2I was able to identify a process that was both more efficient and cost effective. We plan to engage in a follow-up project with NYSP2I to fully implement their solution."

- Felix Radesi
Optimax Systems Inc.

NYSP2I PARTNERS

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The State University of New York

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New York Manufacturing Extension Partnership

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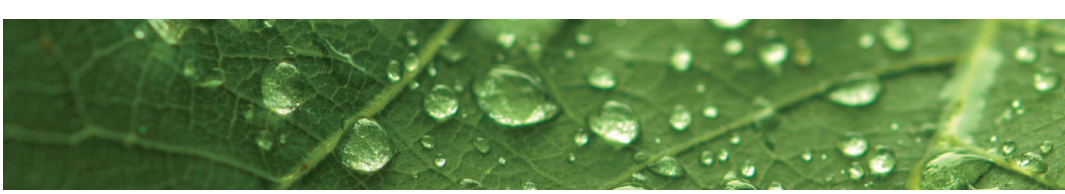

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