



CASE STUDY

Customer: Alcoa- Köfém Ltd (Alcoa Wheel Products Europe- AWPE)
 Site: Székesfehérvár, Hungary
 Items: Forged aluminum wheels for trucks
 Coolant: Emulsion provided by external fluid provider

Oil Expenses Reduced by 40%

CHALLENGE

A forged aluminum truck wheel manufacturer was faced with high unit costs due to the large amount of emulsion that was being consumed and a waste water treatment system running at a critical limit of **100%**. AWPE produces 970,000 wheels per year with emulsion fluid expenses of approximately 300,000€/year (\$380,000/year).

The used emulsion was being refreshed on a daily basis: tanks and pipelines were cleaned and emulsion disposed of into the wastewater treatment system. Additionally, all four production lines were thoroughly refreshed twice a year resulting in a **100%** disposal of emulsion fluid. These processes resulted in a disposal of tremendous amount of usable oil.

The goal was to reduce the amount of emulsion refreshing periods without any loss of wheel quality. The reduction in the frequency of disposal of emulsion would reduce total fluid consumption and lower the wastewater stream.

SOLUTION

CRS created a solution for AWPE to reprocess **100%** of the used emulsion. The production line uses **80%** of the reprocessed emulsion and the remaining **20%** of the reprocessed emulsion goes into the wastewater treatment.

The CRS' custom designed centrifuge is mechanically removing contaminants such as aluminum chips (**30-40%** long bunches), graphite powder and tramp oils. The centrifuge is able to reprocess up to 10,000 liters per day and is completely integrated into AWPE's process.

The process improvement generates savings not only by reducing the amount of emulsion consumed but also by environmental improvements to the wastewater stream. AWPE still produces 970,000 wheels per year however its emulsion expenses have been reduced by approximately **40%**.

CRS Reprocessing Installation at AWPE



Centrifuge

Storage Tanks

Conveyor

To ensure a high quality level of emulsion available to the manufacturing process, CRS designed a custom process flow to separate AWPE's salt water tank and emulsified fluids before centrifugation.

The used and recycled emulsion is being measured by a CRS' trained technician who can monitor the system 24/7, thus guaranteeing quality levels and specifications are maintained. The CRS' onsite technician continuously monitors and controls the reprocessing process by measuring daily emulsion hardness, suspended particles, solid content, concentration and the recovery rate.

RESULTS

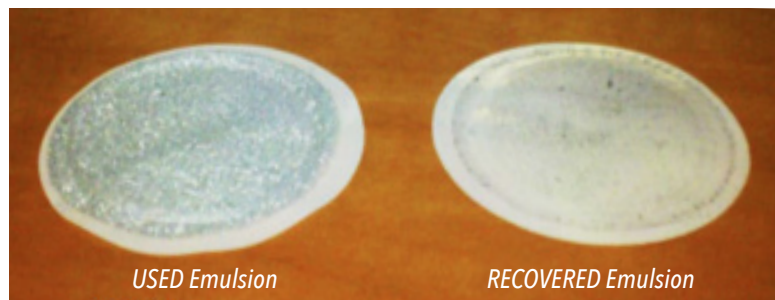
After a successful test trial CRS is currently reprocessing up to 300,000 liters per month with a stable quality that meets the customer's specifications. The facility decreased wastewater stream to **80%** of treatment system's capacity. With respect to emulsion consumption it has been reduced by **40%**.

The CRS' centrifuge made it possible to lower the refreshing amount from 300m³/month of additional emulsion (daily refreshing) to about 64m³/month (refreshing twice/week). The maintenance and refreshing periods are stabilized down to 8 times per month for 4 production lines.

CRS has supported the customer to achieve the following goals:

- Optimize the wastewater treatment capacity utilization from **100% to 80%**
- Reduction in the amount of non-processed oil in the waste water stream as resulted in improving the quality of the wastewater stream by disposing reprocessed oil
- Reduce the refreshing periods from daily to 8 times/month
- Provide consistent emulsion quality with:
 - Reduction by **95%** of particles >10µm
 - Recovery rate >**95%**
 - Equivalent concentration rates between used and recycled emulsion and **0%** loss of oil
 - No additional bacterial and fungus growth due to centrifugation process
 - No increase of emulsion hardness

Particle Contamination



The particulate filter load test shows that approximately **95%** of particles larger than 10µm are being removed.

OPPORTUNITIES

Other savings opportunities for continuous process improvement with the improved control of the concentration through an optimized refresher cycle and/or a buffer tank for storing fluids that will greatly improve AWPE's future economic benefits.