

## Experience Report Paint Sludge Removal with Centrifugal Separators

### Problem

As one of the leading and most innovative manufacturer of high quality automobile components and operating systems for the consumer equipment industry, REUM operates with 5 automatic wet paint shops with altogether 10 paint shops for the coating of plastic parts at the locations Calw and Hardheim. Solvent and hydro paints are consumed.

500 – 600 t of charged water and paint sludge with approx. 70 % residual moisture had to be discharged every year. Due to the high sludge amount and besides the costs for the discharge of the sludge, high expenditures were necessary for the stocking of the tanks as well as for the cleaning of the systems and the areas around

Reum used surface skimmers as paint sludge discharging systems. The paint, treated with coagulant for a de-bonding effect and flocculant for a floating effect on the surface, is continuously stripped of with these systems.

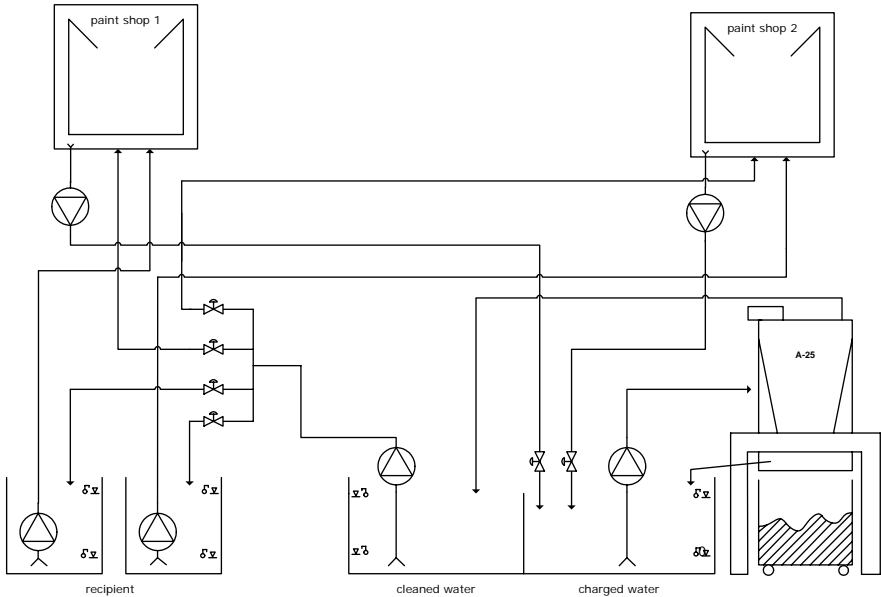
The aim was on the one hand to achieve a significant reduction of operating costs by minimizing the sludge volume and by reducing personnel expenditure and on the other hand less pollution through the discharge of the paint sludge. The use of coagulant and flocculant had to be reduced and the life time of the paint shop water had to be prolonged if possible.

### Solution

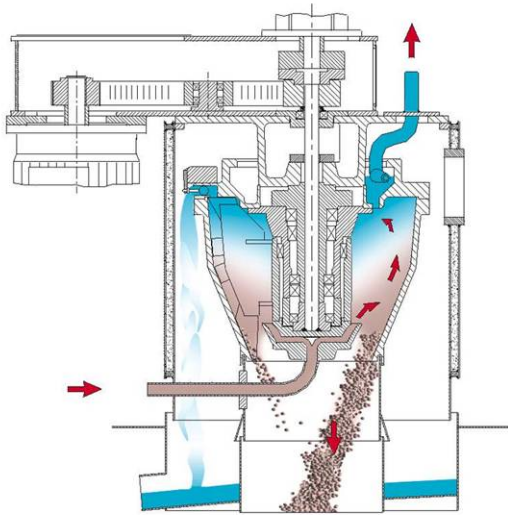
Altogether 4 STA Centrifugal Separators type A-25 replaced the initially installed surface skimmers gradually.

Therefore, operation with several paint shops is possible, even if their water should not be mixed up. Supplementary, the installation of buffer tanks made it possible to “park” the paint shop water in case of sporadic cleaning works.

2 – 3 paint shops were connected with one separator, switching in intervals of one’s choice between the paint shops.



Simplified Flow Chart



function scheme separator A-25

There are 10-20 kg/h of hydro- and solvent paints used in the paint shops; approx. 50 % overspray is collected in the water. The water content per paint shop is between 1.200 l and 2.000 l. The coagulant is adjusted in a way, that hydro and solvent paints can be de-bonded and flocculated with the same product. As this coagulant does not need to float on the surface, there is no more need of flocculants.

A separate pump primes 50 l/min of the paint shop water and guides it into the separator. Therefore, it is possible to clean the paint shop water continuously in stand still periods to eliminate the last paint particles.

Pumps lead the water from the paint shop to a recipient. A perforated basket holds back greater paint cakes and tramp pieces. A feeding pump leads the liquid into the separator A-25, where it runs through the centrifugal field as shown in the scheme above. The solids, which are heavier than the liquid, stick to the drums' side under the influence of the centrifugal acceleration of 2.000 x g.

The cleaned liquid flows back to the clean side of the recipient, therefore it is put for the process' disposal again.

When the maximum sludge quantity is reached (adjustable time interval), the supply stops and the centrifugal basket decelerates. The remaining water escapes through centrifugal valves. The scraping mechanism is activated by a separate running and the separated paint sludge, highly compressed, falls into the container through the drum outlet at the bottom.



The centrifugal separator discharges up to 50 kg nearly dry paint sludge per hour.

A PLC controls carries out the running and the monitoring of the system. The level monitoring of the recipients and the paint shops is integrated in this control as well as the running of each paint shop per diaphragm valves. An after running time of the separator is realized by an interface to the paint shops' PLC over the after running time of the circulation pumps.

## Result

The operation with centrifugal separators reduced the residual moisture of the separated paint sludge by approx. 72%, at the same time the disposal costs per ton were reduced, as the calorific value raised.

Through the easy handling of the separators and trough the reduction of the monitoring for the former surface skimmer,

personnel costs were saved; furthermore the use of flocculant was no more necessary.

In relation to the paint quantity used, there is approx. 16-20% coagulant used in paint shops with a combined system of solvent and hydro paints. The reduction of system failures and stand still times contributed to an amortization of the centrifuges within approx. 1 – 1,5 years.



conventional surface skimmer  
paint sludge with high residual moisture



sludge from separator A-25  
dry paint sludge

