

## Experience report on the processing of cooling lubricant

### Background

At Progress-Werke Oberkirch, a subcontractor to the automobile industry, deep-drawn parts are manufactured from carbon or galvanized steels.

A problem arose on 2 Müller-Weingarten presses in which the cooling lubricant emulsion had to be changed every week due to the increased concentration of foreign oils and fine contamination. In addition, employees were suffering from skin irritations. A belt filter which was already in use on the installation did not improve cleaning performance adequately.

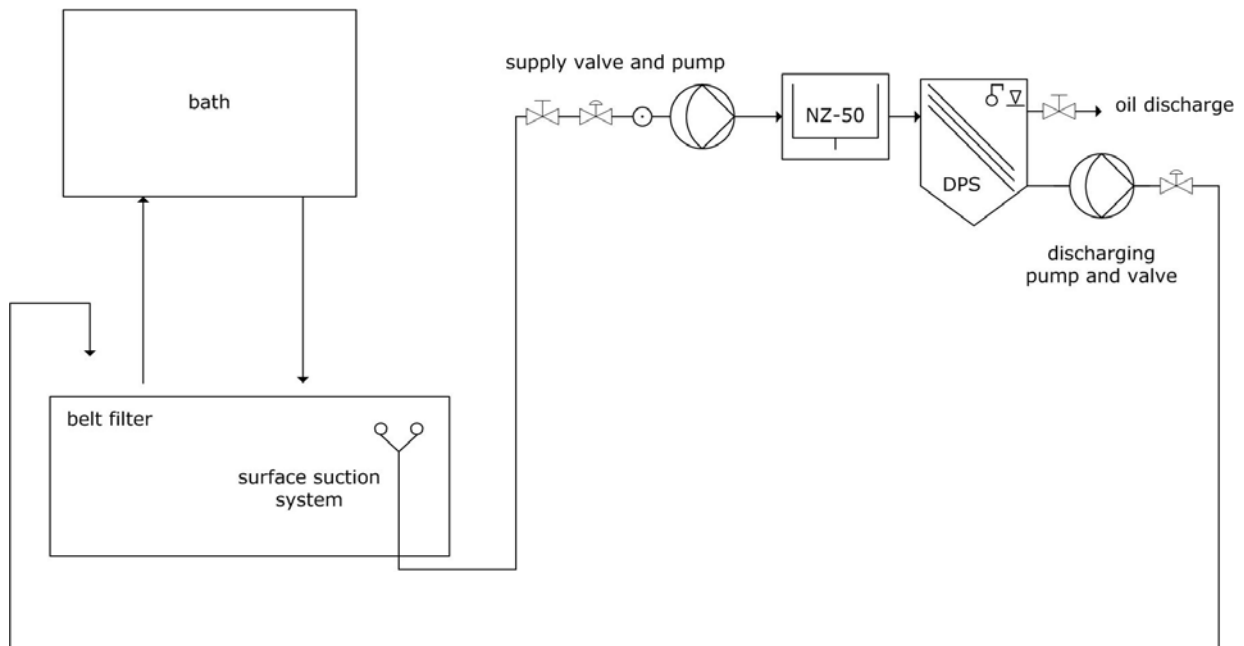
A water-miscible cooling lubricant (emulsion, added in a quantity of 8 – 12 %) is used at a temperature of 30° C, the volume is about 1,000 l.

The emulsion is contaminated with hydraulic oil, belt greasing oil and fine abrasion particles.

### Solution / Realization

STA installed a combination bath maintenance system, which consisted of an NZ-50 centrifuge separator and a DPS-350 oil separator in the bypass on the belt filter.





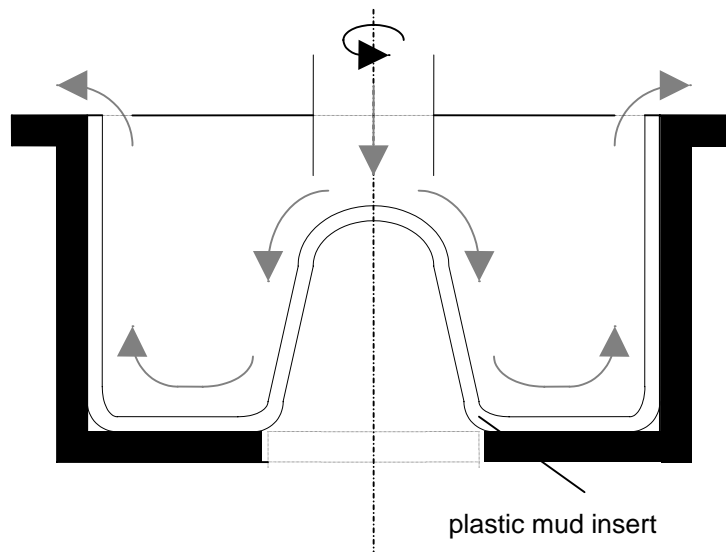
The feed pump uses a surface suction system to force the liquid to be cleaned from the belt filter to the NZ-50 centrifugal separator, where the solids are separated by centrifugal force (at 950 times gravitational acceleration). In the downstream DPS system, the foreign oils are separated and the cleaned liquid is fed back to the belt filter's reservoir container by a recirculating pump.

## Result

This solution by STA enabled the operating life of the emulsion to be extended from 1 to 9 weeks. The employees' skin irritations were reduced significantly.

## STA Separator, Model NZ-50 General process and functional description

The engineering design of the inflow and outflow point on this centrifuge is relatively simple: As is shown in the figure, it is equipped with an upper liquid infeed and an outflow orifice in the form of a gap in the upper edge of the drum, through which the purified liquid flows into the housing, from where it is removed.



A slight free gradient is normally sufficient for the liquid inflow. The solids are deposited in a plastic sludge insert. When the weight of the separated solids reaches a predetermined value, the centrifuge must be slowed down and the sludge insert must be taken out for emptying.

Because of its compact construction, the device can be mounted in processing centers, for example for continuous cleaning of cooling lubricant emulsions during the preparation process in the power circuit. Separation performance can be achieved that is effective for a limit grain size of 10  $\mu\text{m}$ .

## DPS de-oiling device by STA General process and functional description

Plate phase separators rely on the effects of gravity and coalescence to separate liquids having different densities and solids by mechanical-physical means, without the use of chemicals. Tri-phase separators are used more and more often as requirements become ever more stringent, e.g. for separating mineral oils from wastewater, emulsions and degreasing baths. They must be capable of running with very low operating costs, usable anywhere and available in a variety of sizes.

The medium is fed directly into the tri-phase separator by a positive displacement pump (e.g. an eccentric screw pump or a compressed air diaphragm pump). Here, the liquid mixture is passed between parallel plates that are corrugated, providing a substantially larger cross-section. The effects of gravity and coalescence together cause the light phase to collect on the plate surface, where it forms larger drops. The drops rise to the surface of the liquid through the rising apertures in the plates. There they are carried away to the free overflow by the continuous motion of a skimmer.

The cleaned heavy phase passes out of the bottom area of the device through baffles and into a collecting area, and flows down over a skimmer edge. A positive displacement pump arranged after the discharge returns the cleaned liquid.

