

**Experience report on separation of graphite from processing oil
in cast iron chip removal**

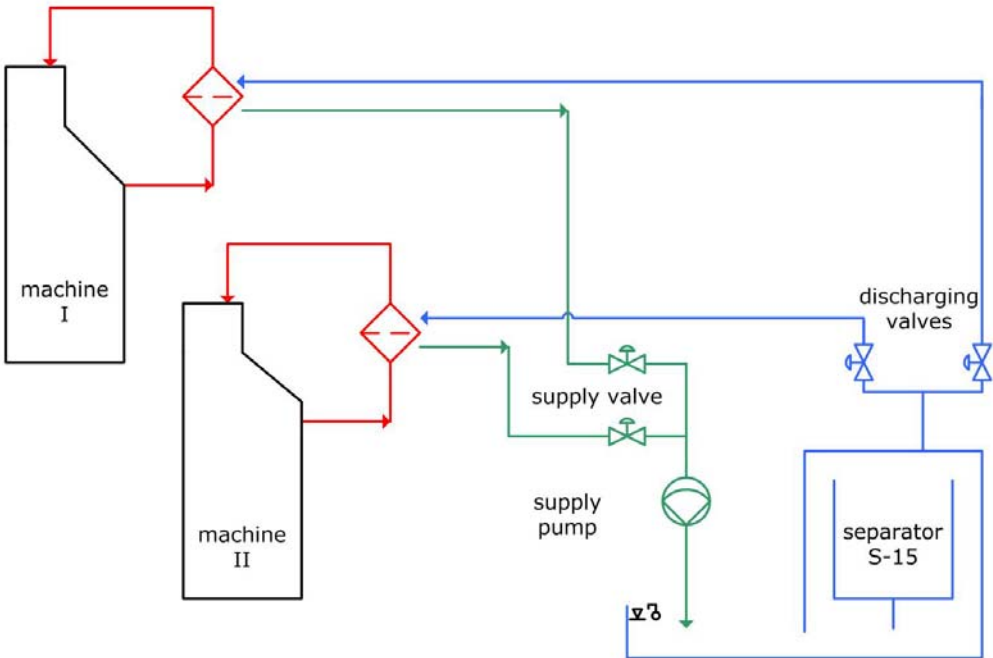
Problem

A customer in southern Germany processes pump housings and valve bodies made from spheric grey cast and grey cast on 2 processing centers. Processing releases fine particles of abraded cast iron and graphite particles, which contaminate the cooling lubricant.

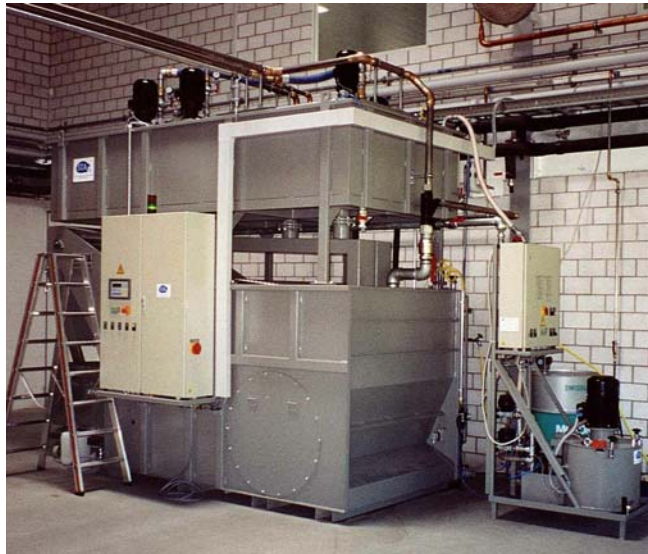
The processing oil had to be replaced after a very few weeks of operation, because the surface quality of the work pieces was degraded as the contamination of the oil increased. In addition, it became impossible to inspect work pieces visually through the inspection ports in the processing machines due to the black color of the processing oil.

The existing filtration plant (one rotary vacuum filter for each center with top-mounted tank) trapped particles only down to a minimum particle size of 50 µm, which led to the finer graphite particles becoming concentrated in the oil.

Solution / Realization



STA installed a high-performance centrifugal separator, model S-15, with manual solid removal in by-pass mode, connected to the clear liquid compartments on both filtration plants. The cleaning time can be adjusted in each case with the PLC; the separator automatically switches between suction on filters I and II at preset intervals.

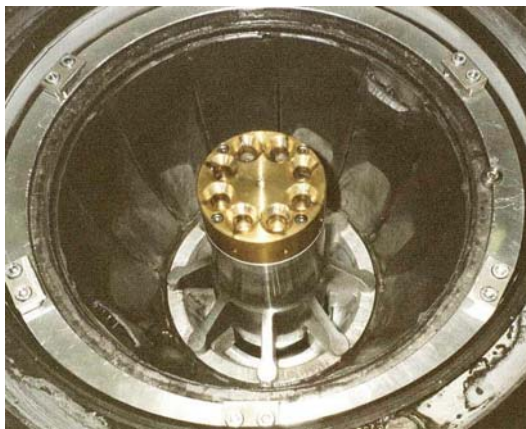


Rotary vacuum filter with S-15 centrifugal separator

The oil is fed at a relatively low partial flow rate of about 30 l/min per plant. This results in a very good degree of separation, because the long residence time in the centrifuge enables even the finest of casting parts to be separated.

The cleaned processing oil is returned to the filtration circuit under a discharge pressure of 0.3 – 0.5 bar from the S-15 centrifuge and can be reused in the machines.

Result



separated graphit sludge

Since its commissioning, the centrifuge separator has been separating about 5 kg per day of the finest graphite. The oil has a visibly lighter, brownish color.

The running time for the centrifuge has been set to approx. 2.5 days (24-hour operation). The sludge insert can be replaced in about 3 – 5 minutes, the sludge weighs about 12 kg and has very low residual moisture.

It has not been necessary to change the oil since the plant system was commissioned in January 2000, only normal operating losses have needed to be replenished. Labor for cleaning inspection doors, the machine table etc. has been significantly reduced.

Use of the S-15 separator thus has both ecological and financial advantages: oil consumption and maintenance costs were cut substantially, as were unscheduled idle times, and the surface quality of the work pieces has improved.