Magnetic filtration

The build-up of micrometre-sized ferrous particles in lubricating fluid can result in the heavy wear and subsequent failure of cement kiln drive transmissions. The application of magnetic filtration technology has proven to not only rectify this issue but can prevent build-up occuring, thereby increasing productivity and extending transmission life.

■ *by* ***Magnom, UK***

The build-up of ferrous contaminant in critical lubricating fluids can result in heavy wear and the failure of cement kiln drive transmissions. The subsequent blocking of oil/lubricant spray nozzles with the ferrous contaminant only makes the attrition worse. The system can be starved of its lubricating oil supply, and/or suffer from super-hard and sharp, micrometre-sized particles of steel passing between critical working surfaces, in this case the gears.

No matter how good the lubricant, if it cannot be kept free from this severely damaging contaminant, it is unable to do its job. The affected particles breech the protective oil film and cause boundary layer rupture of the lubricant, resulting in direct metal-to-metal contact. The subsequent system attrition can lead to more oil changes being needed, as well as increased downtime and maintenance costs, and eventually premature system failure.

Factoring in the cost of replacement parts (in this case the transmissions), as well as engineering/maintenance time to replace the failed units, frequent oil changes and premature preventative maintenance activities (in a vain attempt to improve the cleanliness and condition of the system), the cost of rectifying this now preventable issue is disproportionately huge. With the overall cost typically far greater than that of the failed component, the ultimate cost lies in system downtime and lost production.

Increasing productivity and extending transmission life of cement kiln drives with magnetic filtration

The Magnom solution

To prevent this problem, UK-based Magnom has developed a solution that uses a specially-designed magnetic filter/trap.

The Magnom technology is highly-efficient (single pass) down to sub-micrometre levels, thus protecting any downstream components from the damaging steel contamination. Importantly, the Magnom Magnetic Oil Module also retains the captured contaminant in specially-designed traps to prevent the contaminant being washed off

Figure 1: contaminated filter core, Dominican Republic

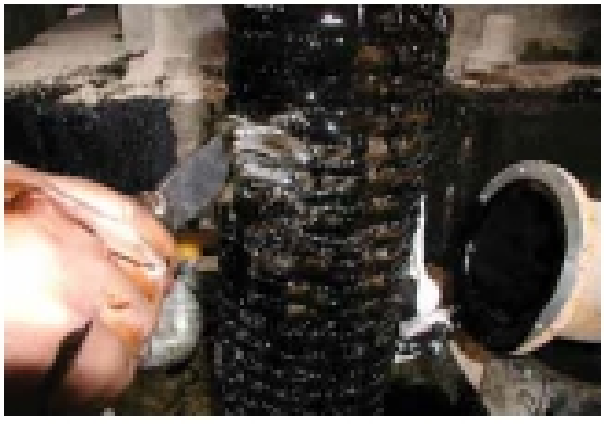

Figure 1: contamination removed from the system after only one month at Bagley Cement, UK.

and reintroduced into the fluid flow.

Other benefits include:

- Increased production availability, ie more up-time
- reduced maintenance costs and engineering resources
- lower component and transmission system replacement costs
- less lubricant usage
- increase in oil life
- pay-back immediate to within four weeks.

Benefits over conventional filter media

When the major source of damaging contamination in a system is ferrous material, typically of a smaller size than the rating of a conventional filter, the Magnom magnetic filter offers a number of advantages.

Conventional media filter needs replacing on a regular basis and restricts the flow of the highly-viscous lubricating oils. Media filters have not only proven incapable of solving the historic system problems of these transmissions, they also risk the condition of a system further with restricted oil supply.

On the other hand, the Magnom solution holds up to 40x the contaminant of conventional filters (size for size), and is non-restrictive and cleanable/re-usable.

Cement industry applications

Magnom's technology has been applied to many customers within the cement industry, as well as in a myriad of other market applications from power generation to Formula One cars.

In terms of the cement industry, the filtration technology has been used to clean highly-viscous lubricating fluids in cement kiln drive transmissions, to protect highly-stressed transmissions running 24/7, and to extend production life while reducing maintenance and repair costs.

Figures 1 and 2 depict how the large build-ups of ferrous contaminant is removed from these critical systems at cement plants in the Dominican Republic and the UK, respectively.

Figure 3 shows the Magnom Max XL installed at a Carmeuse lime plant in the USA.

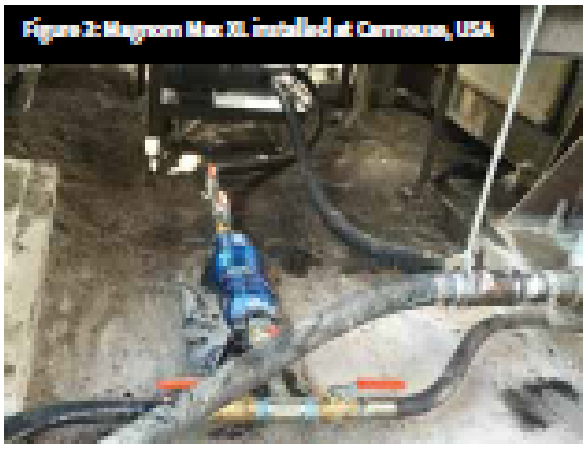

Figure 2: Magnom Max XL installed at Carmeuse, USA

From reactive to maintenance mode

Typically when a Magnom unit is installed into a system experiencing issues, the job in hand is to purge the system of large quantities of historic contaminant circulating within it.

Once this historic threat is removed, the Magnom is effectively in 'maintenance mode', ie removing contamination from the system as it is generated, thus preventing build-up and ensuring the lubricating oil is able to do its job.

Fitted into a new system, the Magnom units are able to maintain oil cleanliness and system health from the start, immediately delivering benefits for the customer.

Figure 4 shows oil analysis data provided for the Dominican Republic plant by Exxon Mobil which carried out the installation and service of the Magnom™ In-Line-Process-Unit (IPU). The graph demonstrates the effectiveness of the Magnom technology in cement drive transmissions and indeed, in transmissions generally.

Optimum oil performance

The removal of very small super-hard and sharp aggressive contaminants from oils breaks the chain reaction of wear caused by their recirculation within the system, enabling the valuable oil in the system to perform at its optimum.

Extended availability of the transmissions to help maintain continuous production is the main driving force behind producers choosing to adopt Magnom's magnetic filtration.

Moreover, the technology is now fitted as an OEM standard on cement plant installations supplied by a leading European cement plant engineering company. ■

Figure 4: oil analysis graph at Dominican Republic cement plant