Magnom® Filtering Lubrication System

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Magnom® Magnetic Filtering – Lubrication System

The Condition Monitoring Department at Cold Reduction conducted a filtration trial on the Five Stand Mill (FSM) Motor Generator Set lubrication system.

A filter cart was used to polish the oil in a kidney loop arrangement, installed with a 3 micron $\beta_3 \geq 100$ Filter.

A Magnom® filter (Magnetic Core) was also connected as a pre-filter to the filter cart.

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MG set white metal journal bearings with running clearance of 125 microns.
MG Set lubrication system contains several filters at different stages.
Ranging from 10 micron to 250 Mesh.

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The filter cart flow rate is:

30 litres per minute.

System Capacity is 3000 litres

The full system was filtered for 1 week.

System turned over approx 100 times.

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The clear bowl of the Magnom® filter allows ease of inspection (depending on fluid clarity). Here the lubricating oil BP Bartran 46 can be seen passing the magnetic core.

The fluid looks heavily air entrained !

BLUESCOPE

Magnom® Magnetic Filtering – Lubrication System

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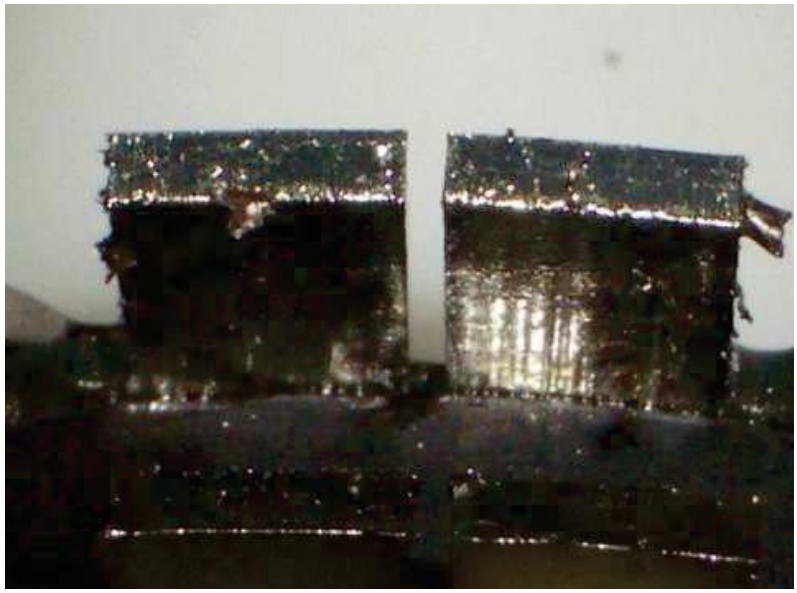
Disassembly of the Filter allows recovery and inspection of collected contaminants. Large particles captured by the Magnetic Core of the Magnom® filter are clearly seen in the first few stages of the filter. The particles are approximately 1-3 mm in length.



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The Magnetic Core of the Magnom® filter also captured very fine ferrous particles.

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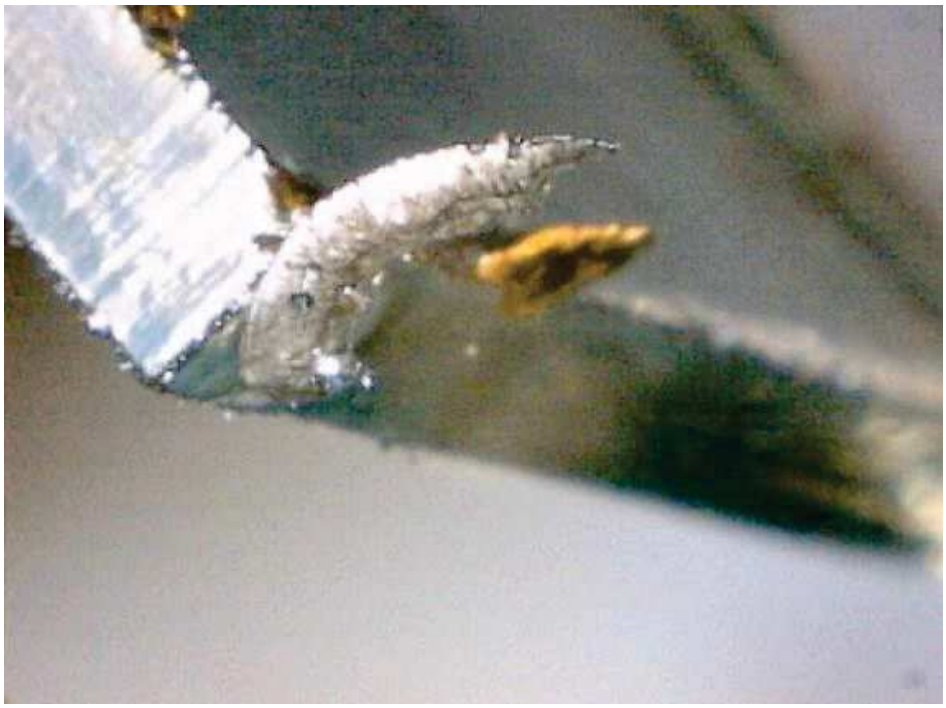
Close-up of large cutting particle attached to magnetic core of Magnom® filter – also unknown particle captured (yellow color).



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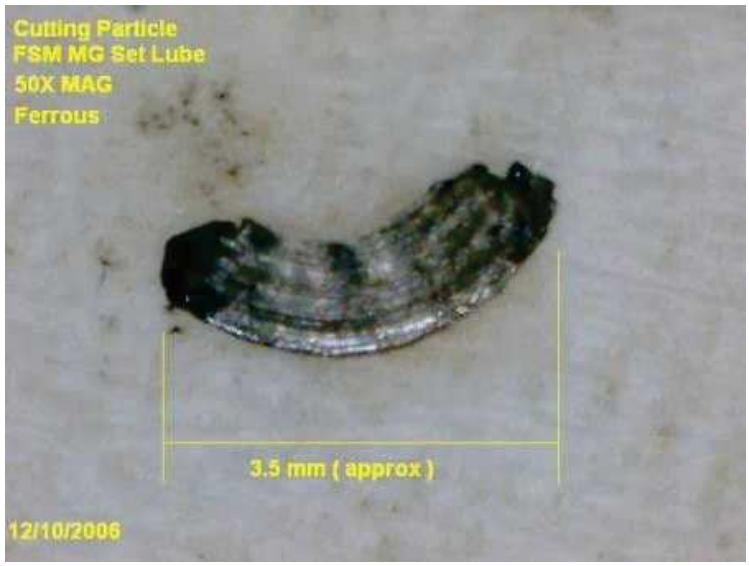
The microscope view of this particle shows defined cutting lines, tempering color and curling.

A large particle of 3.5 mm size found in the MG Set lubrication system is of serious concern.

The origin of the particle is unknown, but there had been some maintenance activity about 2 years prior, which involved hatch installation because the system was not sealed sufficiently to prevent contamination. This could be drill swarf from the hatch installation.



LEARNINGS :

Lubrication System Deficiencies highlighted.

Poor design of lubrication reservoir.
Baffles ??
Suction line too close to return line.
Pump relief valve return above fluid level.

Short lubricant residence time in tank.