

Report of committee on 'Paid Trial' with the compound "Metshield", supplied by M/s KK Distribution, Australia.

BACKGROUND

'MetShield' compound is a product of M/s. 'MetShield Corporation', Australia (formerly 'KK Distributions', Australia). MetShield is a metal conditioner to be mixed with lubricants to reduce friction between two mating surfaces of the components in a machine, results in reduction in wear & tear of the metal components, operational temperature of the circulating oil, amperage consumption and vibration level of the machine. Thus, enhances the life expectancy of machines.

'MetShield' was tested by RDCIS, Ranchi in October 2009. Report of the same is attached herewith in Annexure No. 08.

After successful lab test in RDCIS, M/s. 'MetShield Corporation', Australia had come forward supplying 40 ltrs. of MetShield compound to _____ Plant for conducting field trials on free of cost basis in January 2010. Free trial was conducted between April to June 2010 in Continuous Casting Shop (CCS), Lubrication Repair Shop (LRS) of Central Lubrication Department, Ore Handling Plant and Merchant Mill. A considerable reduction in operational parameters such as vibration, temperature and amperage were observed. Trial report of the same is attached herewith in Annexure No. 09.

Based on successful 'free trial' result, 400 ltrs. of MetShield compound was procured after obtaining Management approval to conduct 'Paid trial'. Seven critical equipments, as mentioned below, were initially identified to conduct the trial so as to assess its performance.

1. Casting Crane No. 1 in Continuous Casting Shop of SMS II.
2. Casting Crane No. 3 in Continuous Casting Shop of SMS II.
3. Mixer Crane No. 3 in Converter Shop of SMS II.
4. Stripper Crane No. 4 & 5 of SMS I.
5. Charging Machine No. 8 & 9 of SMS I.
6. Gearbox 315 (1 no) in Ore Handling Plant
7. Air compressor Model – 2HA2TER in Ore Handling Plant

Afterwards due to not getting clearance, trial could be taken in Casting crane 2 only in place of Casting Crane No. 1 & 3 in Continuous Casting Shop of SMS II.

In OHP trial was conducted in two gearboxes in place of one thereby maintaining total application area as seven.

METHODOLOGY ADOPTED DURING TRIAL

1. Oil consumption, Vibration by Machine SPM-A201, Temperature by Laser Gun and Amperage measurements by Multimeter were done in all the identified equipments first before addition of 'Metshield'.
2. After receipt of the item by the deptts it was mixed in proportion of 1:16 (MetShield : Lubricant) with fresh oil.
3. After application, Vibration, Temperature and Amperage were measured on regular time intervals.

FINDINGS

After adding MetShield into the lubricant following could be recorded.

1. STC Gearbox No. 05 (Ore Handling Plant)

- a) The vibration level in the bearings was reduced at an average 32.36%.
- b) The amperage for running the system was reduced by 5.89%.
- c) The lubricant top-up requirement was reduced by 15%.

Details are mentioned in **Annexure No. 01**

2. STC Gearbox No. 06 (Ore Handling Plant)

- a) The vibration level in the bearings was reduced at an average 24.91%.
- b) The amperage for running the system was reduced by 6.25%.
- c) The lubricant top-up requirement was reduced by 12.5%.

Details are mentioned in **Annexure No. 02**

3. Khosla Reciprocating Compressor (Ore Handling Plant)

- a) The vibration level in the bearings was reduced at an average 25.46%.
- b) Average body temperature of the Gear box was reduced from 64°C to 62°C.
- c) The amperage for running the system was reduced by 2.44% in load condition.
- d) The lubricant top-up requirement was reduced by 15%.

Details are mentioned in **Annexure No. 03**

4. Stripper Crane No. 05 (Steel Melting Shop No. 01)

- a) The vibration level in the bearings was reduced at an average 11.44%.
- b) The amperage for running the system was reduced by 3.85%.
- c) The lubricant top-up requirement was reduced by 20%.

Details are mentioned in **Annexure No. 04**

5. Charging Machine No. 08 (Steel Melting Shop No. 01)

- a) The vibration level in the bearings was reduced at an average 21.75%.
- b) The amperage for running the system was reduced by around %.
- c) The lubricant top-up requirement was reduced by 13.63%.

Details are mentioned in **Annexure No. 05**

CONCLUSION & RECOMMENDATION

Based on above findings it may be concluded that the product 'Metshield' has proved its potential to reduce vibration, noise, amperage, temperature etc which in turn contribute towards increasing life of mechanical components.

Consumption of lubricant also found to be reduced which may be better noticeable if used for longer period.

In light of above recommendations of the committee are as below.

1. In order to establish effect of the product on consumption of lubricant in above equipments it is needed to be used continually over a period of one year. For this, max 600 litres may be procured on one time basis which should fulfil requirement for all the applications for one year.
On successful result it may be procured in future on regular basis subject to availability of Budget.
2. Meanwhile if any other equipment is identified with high vibration, noise, amperage etc then the product may be tried over there from aforesaid 600 litres only.

6. Mixer Crane No. 03 (Converter Shop)

- a) The vibration level in the bearings was reduced at an average 24.09%.
- b) Average body temperature of the Gear box was reduced from 61°C to 56°C.
- c) The amperage for running the system was reduced by 3.58%.
- d) The lubricant top-up requirement was reduced by 8.83%.

Details are mentioned in **Annexure No. 06**

7. Casting Crane No. 02 (Continuous Casting Shop)

- a) The vibration level the bearings was reduced at an average 9.88%.
- b) Average body temperature of the Gear box was reduced from 63°C to 57°C.
- c) The amperage for running the system was reduced by 4.31% in load hoisting condition.

Details are mentioned in **Annexure No. 07**

Besides above following were observed.

1. MetShield was added in all the seven lubrication systems identified for conducting trial. A homogeneous mixture between the lubricant and MetShield was achieved. MetShield did not separate from the lubricating oil during its entire operation.
2. No adverse effect in any of the seven identified equipment was witnessed. No deterioration in the physical properties of the system was noticed by adding MetShield compound in a small proportion (1:16 ratio) with the lubricant in circulation.
3. With the addition of 'MetShield' in the lubrication cycle, the effective life of the lubricant has been enhanced paving the way for reduced lubricant consumption in the system. This results in reduction in periodic topping of the lubricant. Thus, leading to conservation of lubricant, it has been noticed a reduction in lubricant consumption as high as 20%.
4. Reduction in vibration and temperature has culminated a substantial reduction in noise level internally generated through friction.
5. Chemical analysis from RCL and wear debris analysis from RDCIS indicate there is no effect of the item on the lubricant. In the reports viscosity of Compressor oil Hydrol-100 have taken at two different temperatures 40°C and 100°C, Since before adding Metshield oil was too viscous and it was not possible to measure the viscosity at temp 40 °C.