

A step forward in preventive maintenance techniques



Application Of LUBRICLEAN EP & Changeover to GEARFLUID 550

in Pellet secondary ball mill open gear drive
On 27th June 2018

Pellet Plant
JAYASWAL NECO INDUSTRIES Ltd.
Siltara, Raipur(C.G.)

- **PHOTO DOCUMENTATION** of the present condition of the Gear drive.
- Co-ordination with the **ELECTRICAL DEPARTMENT** for proper connection with the application equipment (440 V electrically operated high pressure NOVOJET pump).
- Co-ordination with the **CENTRAL CONTROL ROOM** for timely shut down of the lubricant spray system as well as switching on & off the mill as per the requirement.
- Checking **WASTE COLLECTION ARRANGEMENT** for ensuring cleanliness of the system.
- Explaining the step-by-step application procedure to the team for efficient response during application.



Equipment: SECONDARY BALL MILL(Pellet)
Drive: SINGLE PINION
Flank Width: 650 mm
Lubrication Method: SPRAY

Equipment OEM: MCNALLY SAYAJI
Equipment TPH: 263
Gear Type: Helical
Spray System OEM: LINCOLN HELIOS (5 X 1 NOZZLES)

BEFORE TRIAL	AFTER TRIAL
Product: OG 11 1000 BH	Product: GEARFLUID 550
Lubricant Consumption: 12.5 kg/day	Lubricant Consumption: 5 kg/day

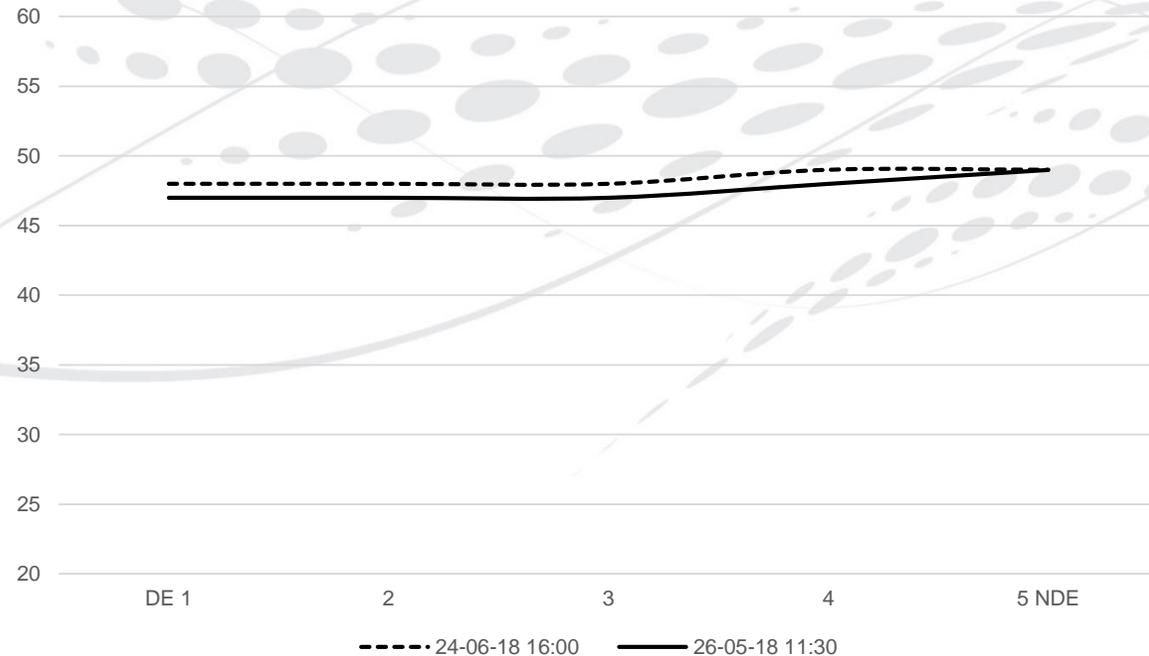
Parameters of Observation:

1. Temperature Readings – Shell, Ambient, Working Flanks
2. Vibration Readings – Pinion Bearing Housing in Vertical, Axial and Horizontal Axes
3. Photo-Documentation – Girth Gear and Pinion working surfaces



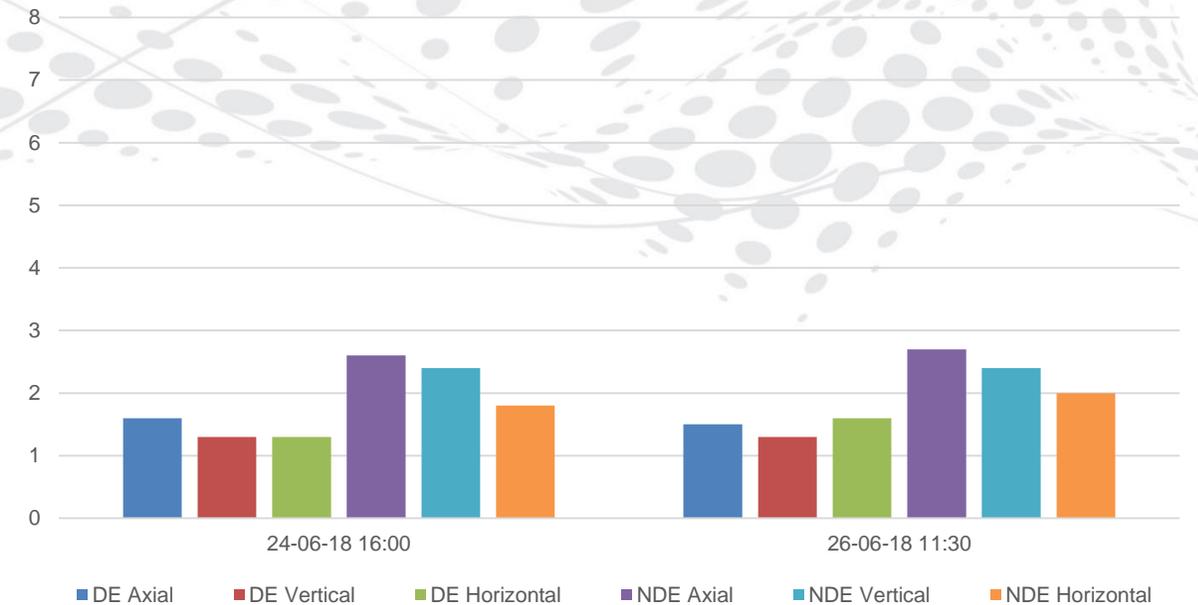
BEFORE TRIAL TEMPERATURE PROFILE

Date & Time	DE 1	2	3	4	5 NDE	ΔT	Amb. Temp.	Shell Temp
24-06-18 16:00	48	48	48	49	49	2	38	39
26-06-18 11:30	47	47	47	48	49	3	38	40



BEFORE TRIAL VIBRATION READINGS

Date & Time	DE (A)	DE(V)	DE(H)	NDE(A)	NDE(V)	NDE(H)
24-06-18 16:00	1.6	1.3	1.3	2.6	2.4	1.8
26-06-18 11:30	1.5	1.3	1.6	2.7	2.4	2.0





During Cleaning Operations, the jet of Lubriclean EP was directed towards the Pinion, Girth Gear as well as the junction of both depending on visual inspection with respect to the adversity of contamination.

Also during cleaning the flank temperatures were continuously monitored keeping in mind the safety of the gear drive.

The drainage of Lubriclean EP was taken care to maintain system cleanliness. The discharge was 16 litres/minute. The Cleaning operation took 40 minutes and an additional 60 minutes were taken for documentation and priming.



PINION BEFORE CLEANING



GIRTH GEAR BEFORE CLEANING

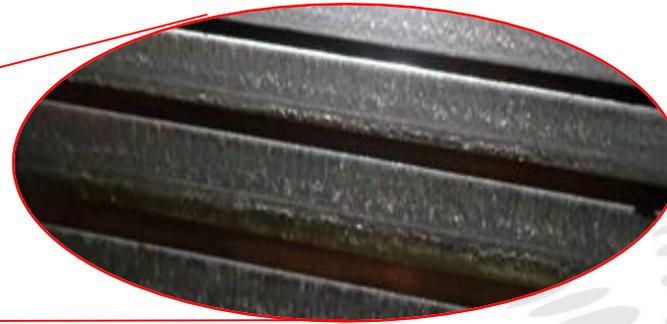


PINION AFTER CLEANING



GIRTH GEAR AFTER CLEANING





The picture on the left shows the girth gear after cleaning. As seen in the picture, numerous micro pittings were observed on the girth gear flank along with a few large pittings.



The picture on the left shows the pinion flank surface after successful cleaning.

We can see the formation of ridges across the pitch line as well as a few pittings were also observed towards the NDE side.

Few pittings are of propagating nature.



Priming is an integral part post cleaning operation. as the existing lubricant washes off after cleaning hence priming is essential to avoid dry running.

In this case priming was done by **GRAFLOG H1 SPRAY** in 500 ml aerosol cans. which ensures better coverage as well as reduces waste.



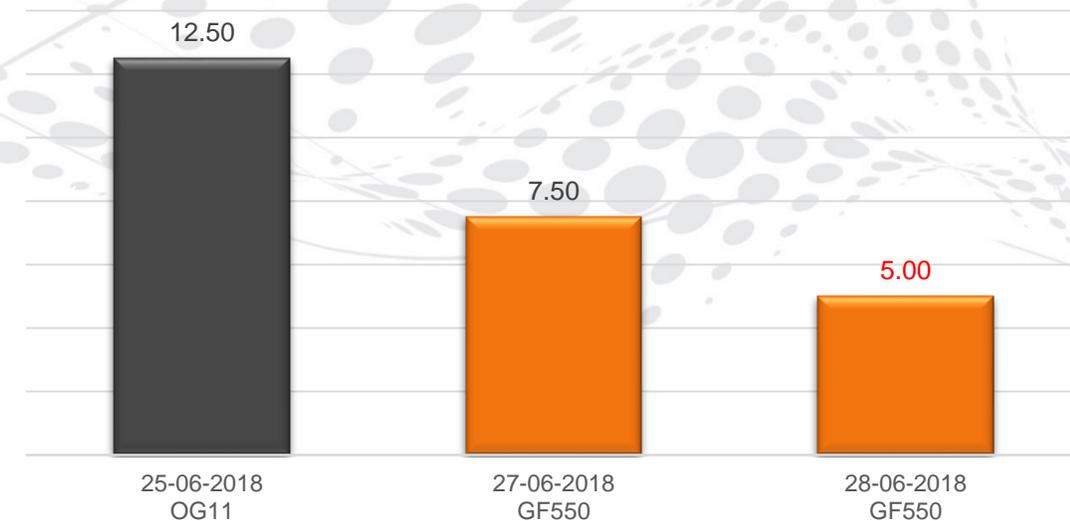
AFTER PRIMING operational Lubricant Switched Over to High viscosity transparent Lubricant

GEARFLUID 550 on 27th June 2018.

Advantages of Gearfluid 550 over existing Lubricant

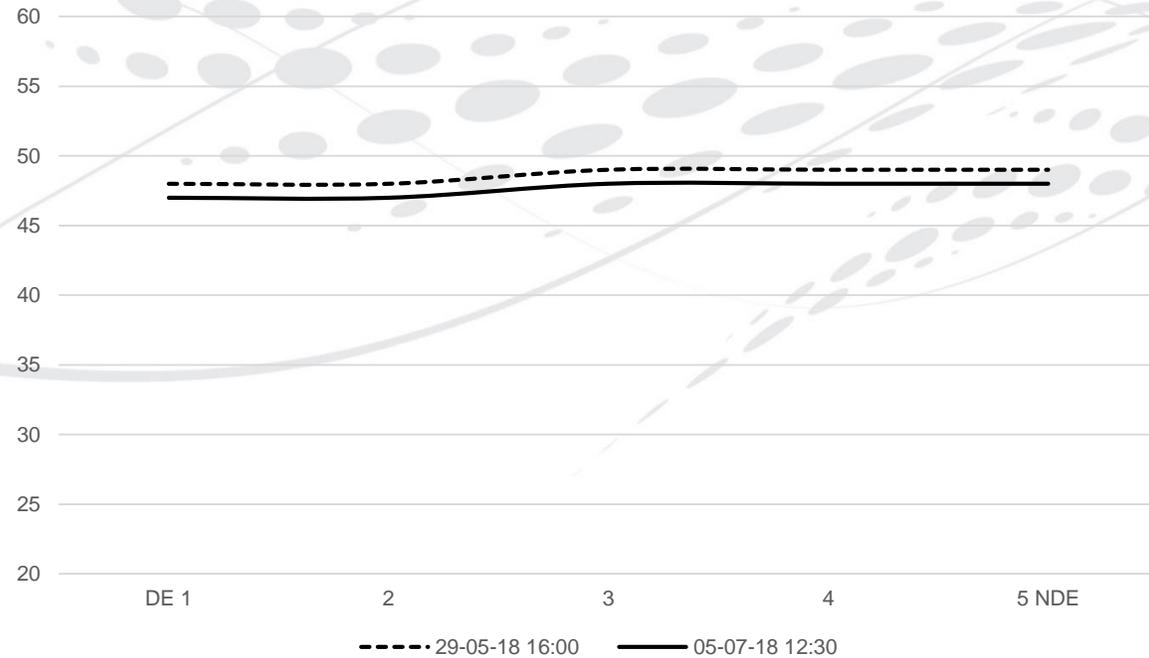
- High 4-ball weld load of 9800 N which ensures better protection
- Switching over to transparent fluid will reduce lubricant consumption by 60%. Hence reducing the disposal cost of waste lubricant.
- Nozzle choking will be avoided as GEARFLUID 550 contains no solid Graphite.
- Better visibility of the tooth flank surfaces of a gear drive.
- Fluid reduces the temperature gradient significantly. Hence reducing the power cost.
- The Present consumption is 5 Kg/day.

Consumption Optimisation (kg/day)



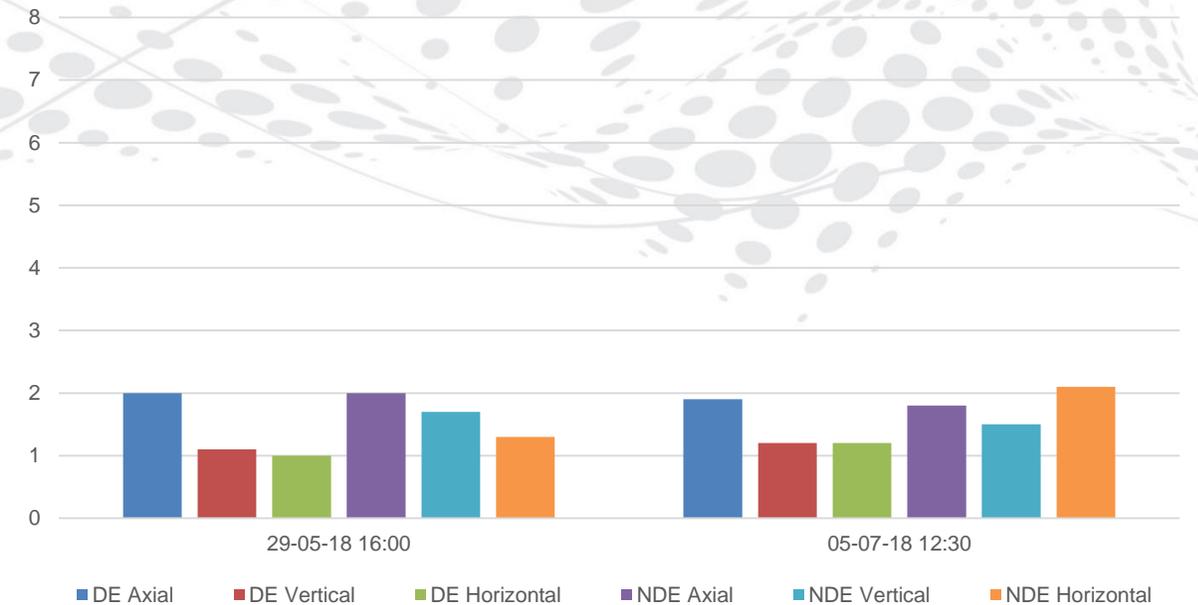
AFTER TRIAL TEMPERATURE PROFILE

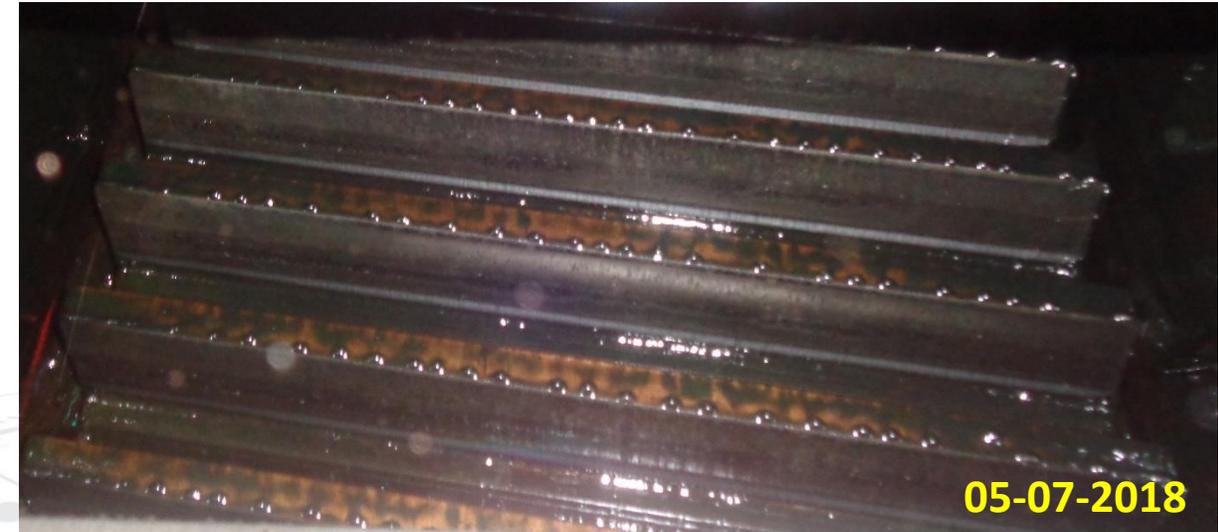
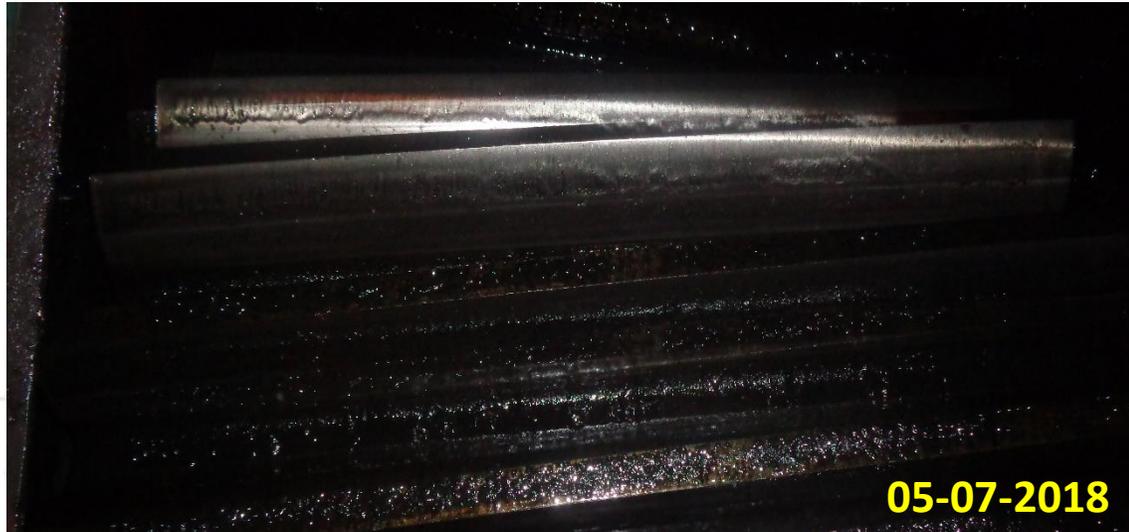
Date & Time	DE 1	2	3	4	5 NDE	ΔT	Amb. Temp.	Shell Temp
29-0-18 16:00	48	48	49	49	49	1	32	36
05-07-18 12:30	47	47	48	48	48	1	32	39



AFTER TRIAL VIBRATION READINGS

Date & Time	DE (A)	DE (V)	DE (H)	NDE (A)	NDE (V)	NDE (H)
29-06-18 16:00	2.0	1.1	1.0	2.0	1.7	1.3
05-07-18 12:30	1.9	1.2	1.2	1.8	1.5	2.1





Recommendations

1. With reference to the inspection, the parameters were found to be stabilizing in nature. So you may continue to run your gear drive at the present consumption safely.
2. During the next shut down we will grind the large pittings with a high speed grinding burr and for the micro pittings to be polished it is recommended to run your drive with our running in lubricant for at least 200 hours.

THANK YOU

