

“Bar Mill - Transfer Chain Lubrication” in Steel Industry

Country:	INDIA
Segment:	Steel
Customer:	JSW Steel Ltd. – Dolvi Works
Location:	Dolvi, Pen, Raigad, Maharashtra
Department:	Bar Mill
Equipment:	Bundling Station
OEM:	DANIELI
Component:	Transfer Chains
Details:	Bundling Station – 02
OEM Approval:	No

Equipment Process:

Transferring different sizes (diameters) of Hot TMT Bars/Rods after their length cutting for bundling.

Before:



Current Operating Conditions / Application Challenges

- No Strain/Mark of lubricant should come onto bars
- Should sustain higher temp. of about 250–300°C
- No failures with existing lubricant since last 05 Yrs.
- Minimal wear rate required
- Dusty environment

Customer Problems:

- High Lubricant Rate
- High Quantity/Volume of lubricant ⇒ Higher lubricant Cost involved
- Monopoly of lubricant supplier

Lubrication Practice before Trial:

- Lubricant: **OKS 570 & JETLUBE MOLY-MIST**
- Lubrication Method: Manual Application
- Consumption: Around 30-35 Litres/15 days

Lubrilog Solution – L-PTFE SPRAY

- PTFE – Bonded Coating
- **Clear Visibility** due to Translucent form
- **Aerosol Spray form** ⇒ **Even Film Thickness** ⇒ **Less Wastage** ⇒ **Lubricant Consumption Optimization**
- Maximum/Large surface coverage compared to manual application by brush
- **Low Coefficient of Friction of PTFE** ⇒ **Less wear & tear** of components

- **Better film thickness** avoids metal to metal contact so **reduction in wear**
- Designed to **work under heavy Loads** on continuous operating conditions at dusty environment
- **Long equipment reliability** and **Extended Service Life** of Transfer Chains

Trial:

Trial on **Bundling Station – 02 – Transfer Chains** was started with **LUBRILLOG L-PTFE SPRAY** after the replacement of “04 Old Full Links with 04 New Full Links” in the “05th Row of Transfer Chains in 1st, 2nd, 3rd & 4th Chains respectively” on **25-November-2020** at **Bar Mill Section of M/s. JSW Steel Ltd. – Dolvi Works.**

- Agreed Trial Observation Period: **02 Months**
- Trial Concluded/End Date: **01-February-2021**
- Trial Status: **SUCCESSFULLY COMPLETED**

Current Condition:



Observations:

- Before replacement of 04 New Full Links, their sizes & dimensions were noted to Check the Wear rate using **L-PTFE SPRAY** at the end of the Trial
- Trial was started with a lubricant consumption of **09-10Nos of Cans/Bottles (4.5 Litres)** per application for **40 Nos of Chains (32 Nos – Long chains & 08 Nos – Short chains)** at Bundling Station – 02
- **No Strains/Marks were observed** on the Bars
- No – 02 Full Link was removed from the 2nd chain of 05th row for the Verification of Wear Rate
- **Observed Wear Rate of No – 02 Full Link was Less than 0.1 mm**
- **No failure of Chains** during the Trial period was observed. Hence, Trial was successfully completed

Benefits to Customer with Lubrilog L-PTFE SPRAY

- **Reduced lubricant consumption by 5-10%** due to Aerosol Spray form



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- Reduced Wastage of lubricant
- Reduced Overall Lubrication Cost of around 14-15%
- Better service to the customer due to competition

Business Potential for LUBRILOG:

- Potential: **1600 Nos.** Cans/Bottles
- First PO Received: **July 2022**
- First PO Quantity: **400 Nos.** of Cans/Bottles supplied against the first PO

Cost Savings to the Customer:

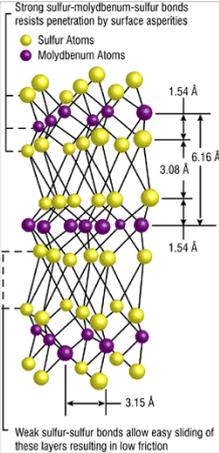
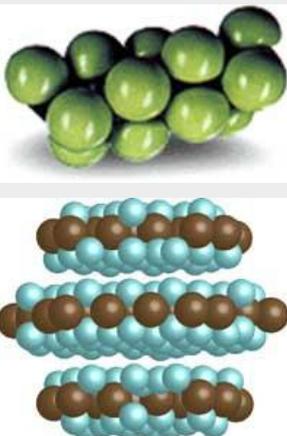
	Before	After
Lubricant	OKS 570	L-PTFE SPRAY
Rate, INR/UOM	INR 6500 / LTR	INR 6180 / LTR
Annual QTY	800 LTR	720 LTR
Annual Cost	INR 52.0 Lac	INR 44.50 Lac
Savings	INR 7.5 Lac / Year (14%)	

TECHNICAL COMPARISON BETWEEN OKS 570 & LUBRILOG L-PTFE SPRAY:

PROPERTIES	OKS 570	LUBRILOG L-PTFE SPRAY	REMARKS
Visibility/Color	Whitish	Translucent (Whitish)	⇒ Comparable
Solid Lubricant	PTFE	PTFE	⇒ Comparable
Solvent	Solvent Mixture	Solvent Mixture	⇒ Comparable
Operating Temperatures	-180°C to 260°C	-200°C to 250°C	⇒ Comparable
Surface Coverage	10 m ² /Kg	5-6 m ² /400 ml Can	⇒ Minimum 20% reduction in Consumption ⇒ 25% - 30% Lubricant Cost Optimization
Method of Application	Brush	Spray	⇒ Maximum/Large Surface Coverage Area due to Spraying compared to Brushing ⇒ Even Film Thickness ⇒ No Wastage ⇒ Less consumption



TECHNICAL COMPARISON BETWEEN JET-LUBE MOLY-MIST & LUBRILLOG L-PTFE SPRAY:

PROPERTIES	JET-LUBE MOLY-MIST	LUBRILLOG L-PTFE SPRAY	REMARKS
Visibility/Color	Black (Opaque)	Translucent (Whitish)	<ul style="list-style-type: none"> ⇒ Easy visibility for Inspection ⇒ Better Maintenance / Housekeeping
Solid Lubricant	<p>MoS₂</p> <p>(COF – 0.07)</p> <p>(WSD – 710 μm)</p>	<p>PTFE</p> <p>(COF – 0.03-0.05)</p> <p>(WSD – 360 μm)</p>	<ul style="list-style-type: none"> ⇒ Low Coefficient of friction compared to MoS₂ ⇒ Less wear rates (see WSD – Wear Scar Diameter) ⇒ Better / Increased Service life
Crystal Structure			<ul style="list-style-type: none"> ⇒ MoS₂ is of Crystalline Layer Lattice (Lamella) Structure with sharp edges & Hexagonal form ⇒ PTFE is of Long Linear Chain Bonded Molecular Structure with Round & Slippery surface
Working Phenomenon	MoS ₂ lubricates Sacrificially by transferring its lubricating layers to mating surfaces	It is considered as the Most Slippery material in existence along with the Long Linear Chain Molecular Bonding	<ul style="list-style-type: none"> ⇒ Considering working phenomenon & crystal structure of both, PTFE has strong bonding strength & adhesion property with the mating elements/surfaces
Solvent	Solvent Mixture	Solvent Mixture	⇒ Comparable
Operating Temperatures	-184°C to 399°C	-200°C to 250°C	⇒ Suits the application requirement
Film Thickness	25 μm	10-12 μm	<ul style="list-style-type: none"> ⇒ Higher film thickness of MoS₂ is needed to ensure the continuous lubricant film onto the mating surfaces due to its sacrificing layers of MoS₂ coating ⇒ For PTFE less film thickness can work for longer periods based on its crystal structure & working phenomenon



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Lubrication Manner	Dry Lubrication	Bonded Coating	<ul style="list-style-type: none"> ⇒ Better Relubrication Interval at least by 3 times ⇒ Consumption Optimization ⇒ Cost Optimization
Method of Application	Spray	Spray	<ul style="list-style-type: none"> ⇒ Even Film Thickness ⇒ No Wastage ⇒ Less consumption

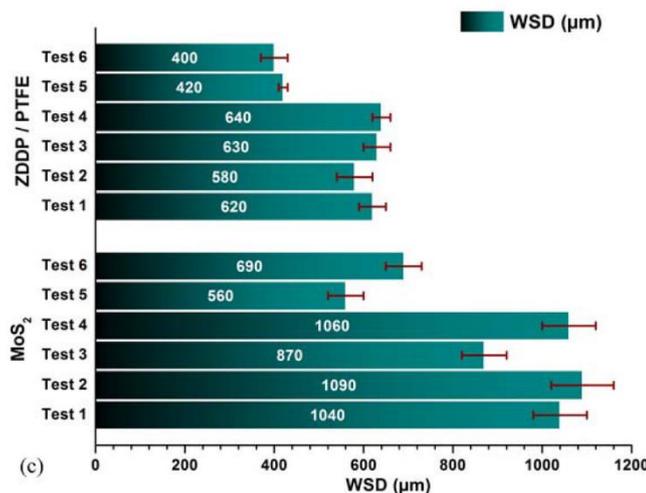
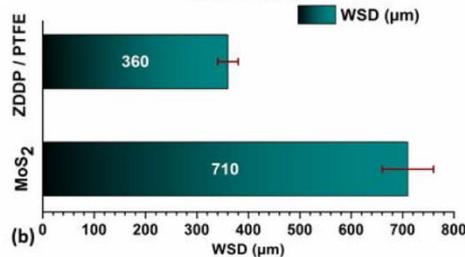
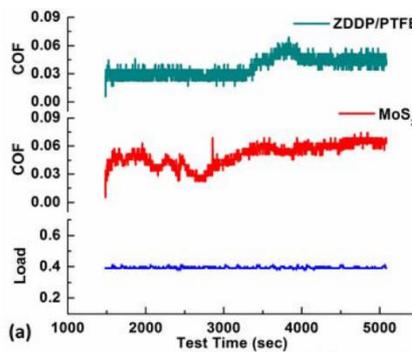
Note:

Please find the following “ANNEXURE” for the In General Test Results of MoS₂ & PTFE for your reference.

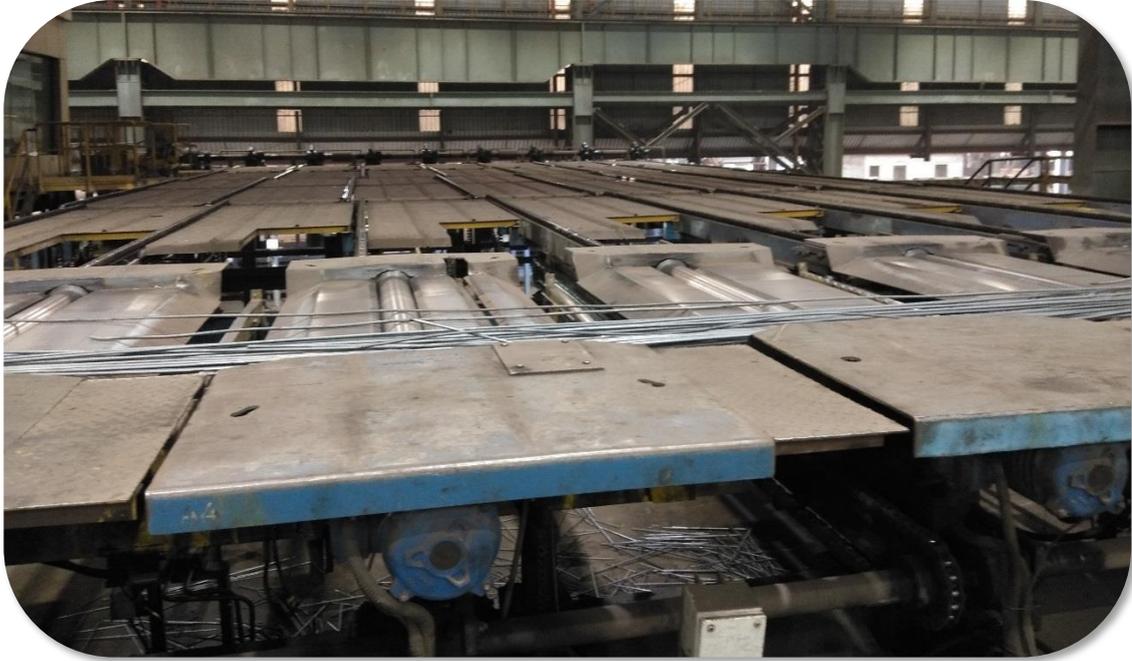
LUBRILLOG commits priority to reliability, performance and safety of the equipment/drive over lubricant consumption and cost optimization, under any circumstances.

ANNEXURE

In General Test Results of MoS₂ & PTFE for the Coefficient of Friction (COF) & Wear Scar Diameter (WSD):



BUNDLING STATION - 02 - TRANSFER CHAINS





REPLACEMENT OF OLD FULL LINKS WITH NEW FULL LINKS FOR TRIAL PURPOSE



FULL LINK - 01



FULL LINK - 02

FULL LINK - 03



FULL LINK - 04





FULL LINK REMOVED AFTER THE TRIAL FOR WEAR MEASUREMENT

