Technological Innovation on conveyor Idlers

By

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Background

Phosphatic Fertiliser

- Includes DAP, MAP, NPK, SSP and by-product Phosphogypsum
- Highly hygroscopic leading to moisture deposition on the steel idlers and corrosion thereafter
- Corroded Idlers damages the rubber belt leading to frequent replacements, costly downtime and productivity loss

Movement of Bulk Material

- Belt conveyors are most commonly used to transport bulk material for decades
- Most reliable and cost-effective solution
- Belt conveyors can transport material up steep inclines, over hills and valleys, across bodies of water, above and below ground

Major components of Belt conveyors

- Pulleys
- Idlers
- Rubber Conveyor belt

What is an Idler?

- Supports conveyor belt
- Carrying Idler supports the belt for carrying the material.
- Return Idler supports the belt on its way back to the loading zone after unloading the material.

What is an Idler?

- Impact Idlers at loading zone for absorbing impact

Traditional idlers in a conveyor system

- Steel Idlers
- Rubber lagged Steel idlers
- Polyethylene sleeved steel idlers

Solution to problems of steel idlers

- Innovation of Light weight and non-corrosive Patented Carrying, Return & Impact Idlers

HPPE Polymer Idlers!!!

India Patent No. 299000

Major problems faced with Steel Idlers

- Corrosion- Fertilisers like DAP, MAP, SSP, Urea and by-product Phosphogypsum are highly hygroscopic
- Hygroscopic nature of fertilisers tends to moist the idlers leading to corrosion
- Corroded idlers damages the soft rubber belt, leading to frequent down time, replacement of idlers and the belt increasing the cost of operations
- Bearing seizure: Surface of the idlers forms a knife edge leading to damage of the belt

Major problems faced with Steel Idlers

- Frozen Idlers - Increases the friction against the belt consuming additional power from the drive motor

➢ Heavy in weight requiring more energy to rotate the idlers

➢ Material deposition on the return idlers leading to belt travelling off centre and damaging the edges of the belt

All these leads to costly down time, increased power consumption, reduced belt life, increased consumption of idlers and productivity loss

HPPE (High performance polyethylene) Polymer idler

Features:

- Light weight
- Corrosion-resistant
- Very smooth surface
- Impact resistant

Components of HPPE Polymer idler

- Tube shell- Made of HPPE material with surface roughness of 0.00022 microns/sq.mt and molecular wt of 3.8 million gms/mol
- Non-metallic Shaft - Made of Adventex glass fibre and epoxy resin
- Deep groove seize resistant ball bearing with integral contact seal
- Double labyrinth seals made of nylon 6
- Additional Contact sealing
- Rain cap made of nylon 6
- Life sealed lithium base grease

Key benefits with installation of HPPE Polymer idler

- Light weight – 3 times lighter than steel benefitting in energy saving
- Corrosion-resistant - Increased belt life

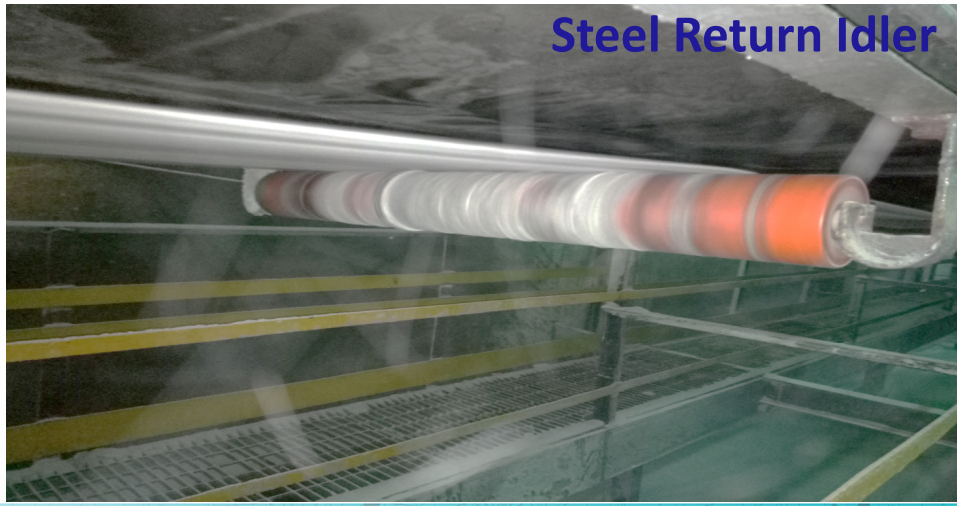
HPPE Idler

Key benefits with installation of HPPE Polymer idler

- Material deposition – almost NIL increasing belt life

HPPE Return Idler

Steel Return Idler



Key benefits with installation of HPPE idler

- Bearing seizure - Forms a rounded area unlike a sharp knife edge in steel idlers

HPPE Carrying Idler

Steel Carrying Idler

Key benefits with installation of HPPE Polymer Idler

- Crushed Rock phosphate handling - Dusty atmosphere
- ➢ Additional Contact sealing prevents ingress of moisture and dust thereby increasing bearing life

Key benefits with installation of HPPE Polymer idler

- Installation - HPPE idler fits in easily to the existing frames
- Bearing seizure- Forms a rounded area avoiding belt damage
- Replacement- Reduced consumption of idlers and belt
- Efficiency- Reduced downtime and improved productivity

Outcome – Improved profits !!!!

Benefits of HPPE Polymer Idlers

➢ **Tangible:**

- Reduced stock levels
- Reduced consumption of Conveyor belt
- Reduced Energy consumption
- Reduction in belt mounting costs
- Improved productivity

➢ **Intangibles:**

- Employee work motivation
- Reduced belt repair costs

Case Study : DAP Handling Conveyor

CC 40 mtrs, BW 600 mm, Length 94 Mtrs, Nos of idlers 182, TPH – 680, Belt Speed 0.75 mps

Particulars		M S	HPPE
Rollers			
Life	(Months)	4	24
Cost of Rollers	(USD)	43,758	12,155
Savings On Rollers	(%)		**28%**
Belt			
Life	(Months)	4	24
Cost Per Belt	(USD)	47160	7860
Savings On Belt	(%)		**17%**
Cost For 24 Months			
Roller	(USD)	43,758	12,155
Belt	(USD)	47,160	7,860
Total Savings	(USD)	90,918	20,015
Percentage	(%)		**22%**

Comparison of HPPE Polymer with Steel Idlers

Description	HPPE Idler	Rubber lagged steel idler
Size	114 x 250 Lg	101 with 6 mm lagging x 250 Lg
Weight (lbs)	3.39	9.48
Break away force(lbs)	0.26	0.39
Wall thickness (mm)	7.10	4.50
Surface finish	Smooth and non sticky	Surface irregular due to rubber lagging
Material adhesion to surface	Almost nil	Sticks to the surface
Sound	Silent operation	Noisy operation

Comparison on weights of HPPE Impact idler with Steel

Description	HPPE Impact Idler (Fig-10a)	Steel Impact with rubber ring (Fig-10b)
Size	160 x 235	160 x 235
Weight of Idler (lbs)	6.67	18.13

Fig-10a

Fig-10b

Food Grade HPPE White Idler

Other applications of HPPE idlers

Mining

Fertilizer Handling

Coal Handling

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or

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Thanks for your valuable time!!!