



Mill drives and transmission is an important due to –

- **Performance of extraction and moisture reduction**
- **Investment**
- **Maintenance**
- **Energy saving**

MILL DRIVE AND TRANSMISSION

- Conventional Mill drive mainly consists of **Steam Turbines**.
- Turbines are operated at **3000 to 6000 RPM** to deliver power and torque to gear box which finally transmit the same to Mills below **6 RPM**.



MILL DRIVE AND TRANSMISSION

- A set of High Speed and Slow Motor Gear Trains is used to achieve the eventual operating speed and the power requirement at the mill.
- These conventional drives are not only cumbersome occupying huge space but also needs high maintenance and operating cost.



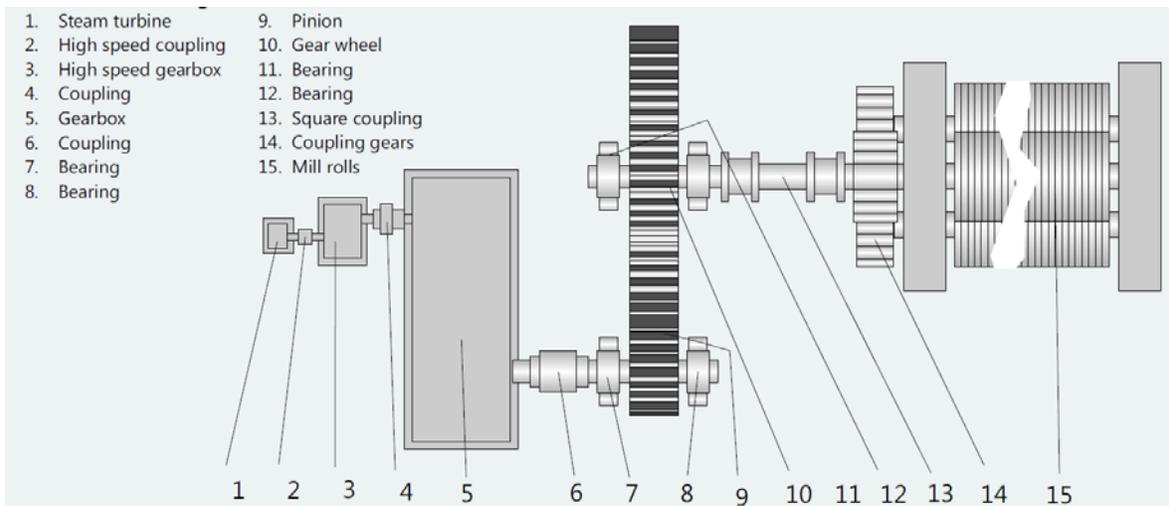
MILL DRIVE AND TRANSMISSION

Sugar industry is now entering in to a new era where efficient and compact Planetary / Direct drives are now replacing the conventional system with successful results in terms of –

- **POWER SAVING**
- **EXTRACTION**
- **LESSER FOOT PRINTS**



CONVENTIONAL SUGAR MILL DRIVE

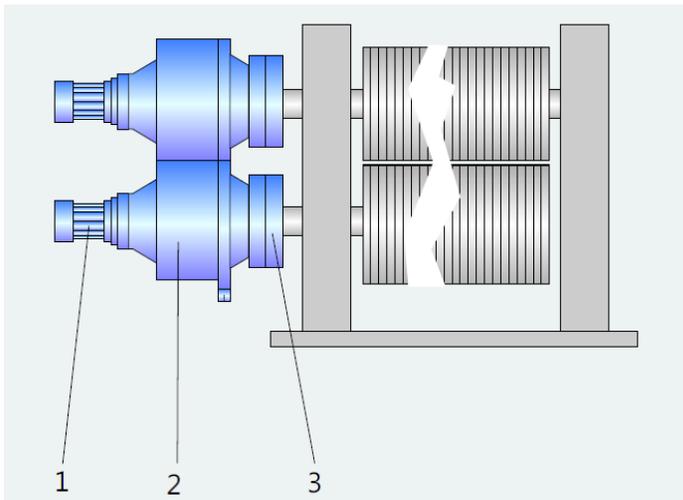


INCREASE IN MECHANICAL EFFICIENCY

... TO
INNOVATIVE PINIONLESS MILL DRIVE
CONSISTING OF SHAFT MOUNTED
GEARBOXES DIRECTLY ON THE ROLLER SHAFT



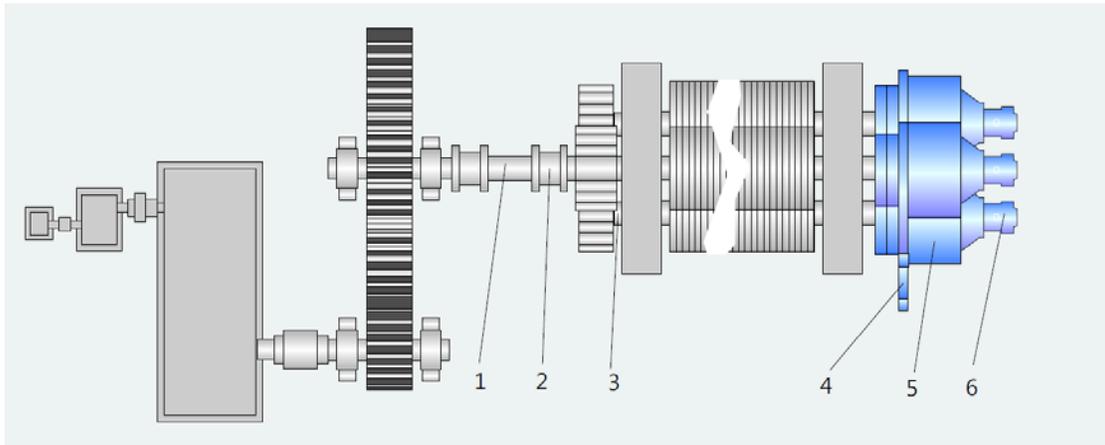
INDIVIDUAL ROLL DRIVE



**Individual mill roll drives without
Couplings and Cumbersome
reduction gears**

1. Electric motor
2. Planetary Gearbox
3. Special flange connection

MEASURING POINTS



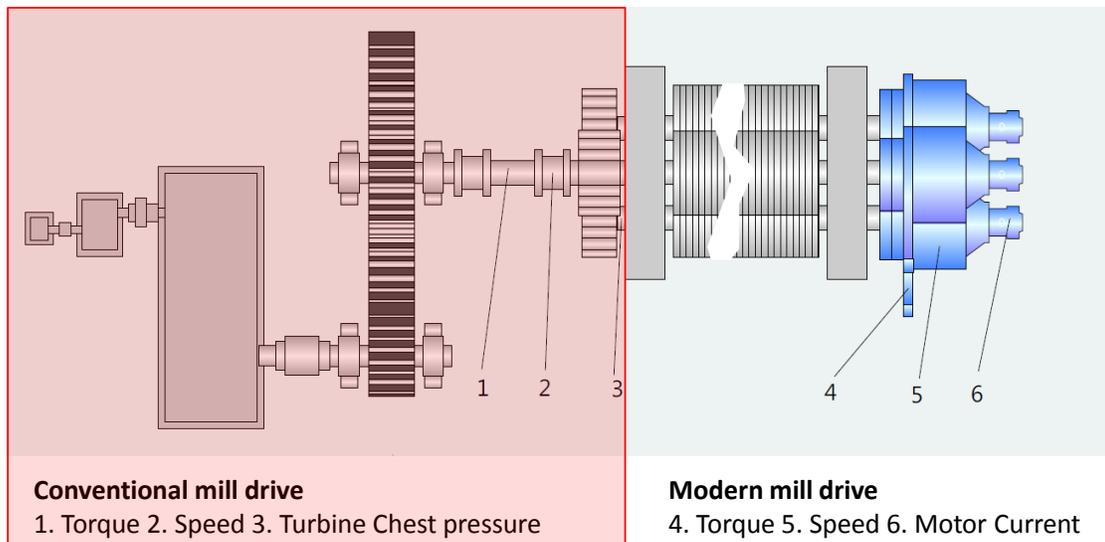
Conventional mill drive

1. Torque 2. Speed 3. Turbine Chest pressure

Modern mill drive

4. Torque 5. Speed 6. Motor Current

MEASURING POINTS



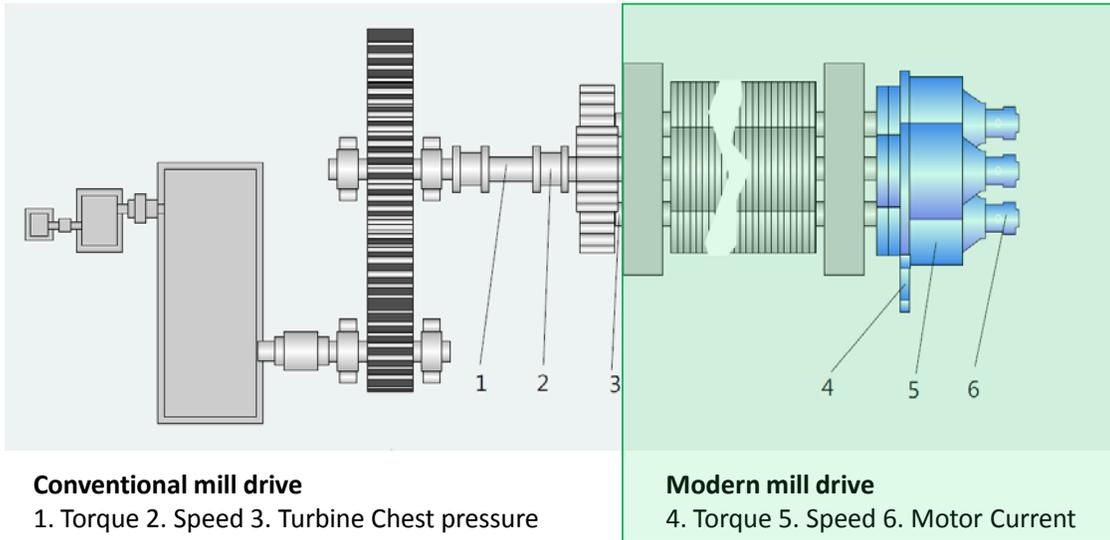
Conventional mill drive

1. Torque 2. Speed 3. Turbine Chest pressure

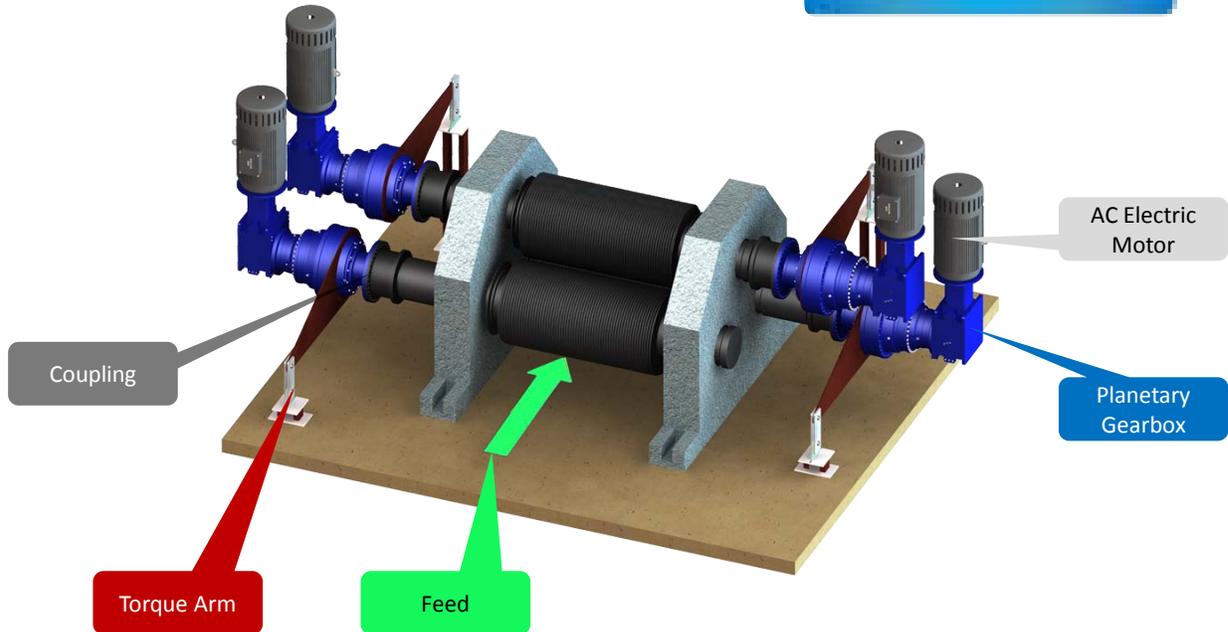
Modern mill drive

4. Torque 5. Speed 6. Motor Current

MEASURING POINTS



INDIVIDUAL ROLL DRIVE



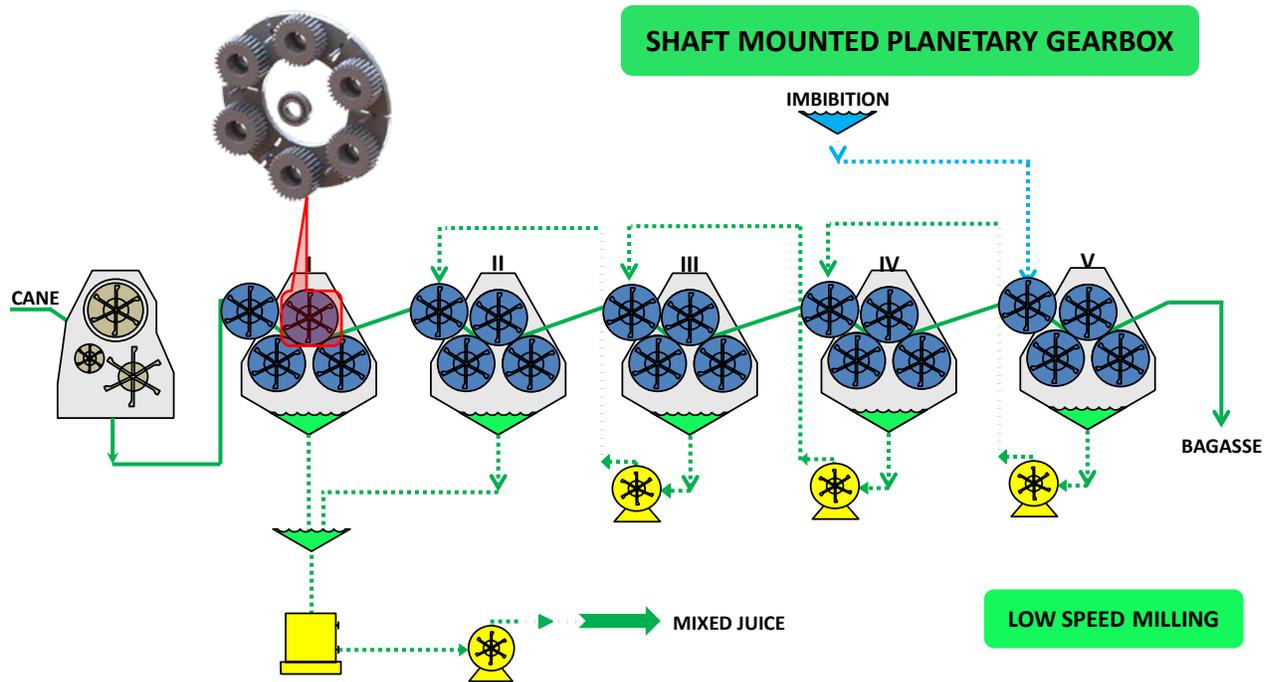
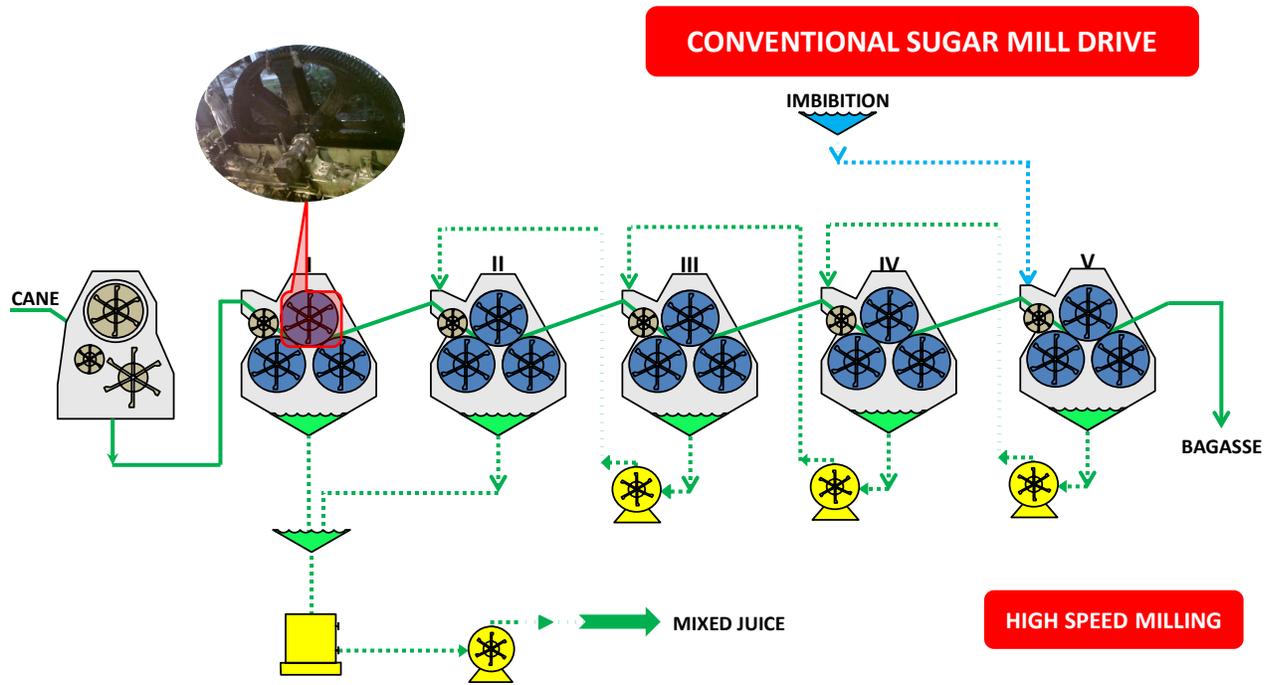
INDIVIDUAL ROLL DRIVE



ASSIST DRIVE SYSTEM

Electric Motors directly mounted on roll shaft (no tail bar in between) and controlled by VFD





POWER / TORQUE TRANSMISSION

Power / Torque Transmission	Power [kW]	Efficiency [%]	Power Transmitted [kW]	Ratio [i]	Output Speed	Torque Transmitted [Nm]
Stage 1 - Electric Motor – 980 RPM	800	95%	760	1	980	7,409
Stage 2 - Enclosed Reduction Gear	760	96%	730	24	41	170,709
Stage 3 - Open Gearing / Plummer Block Bearings	730	82%	598	7	6	909,876
Stage 4 - Tail Bar and Other Frictional Losses	598	98%	586	1	6	891,679
Stage 5 - Crown Pinion	586	92%	539	1	6	820,345

CONVENTIONAL

POWER / TORQUE TRANSMISSION

	Power [kW]	Efficiency [%]	Power Transmitted [kW]	Ratio	Output Speed	Torque Transmitted [Nm]
Stage 1 - Electric Motor – 980 RPM	800	95%	760	1	980	7,409

Output RPM – 6 – High Speed Milling

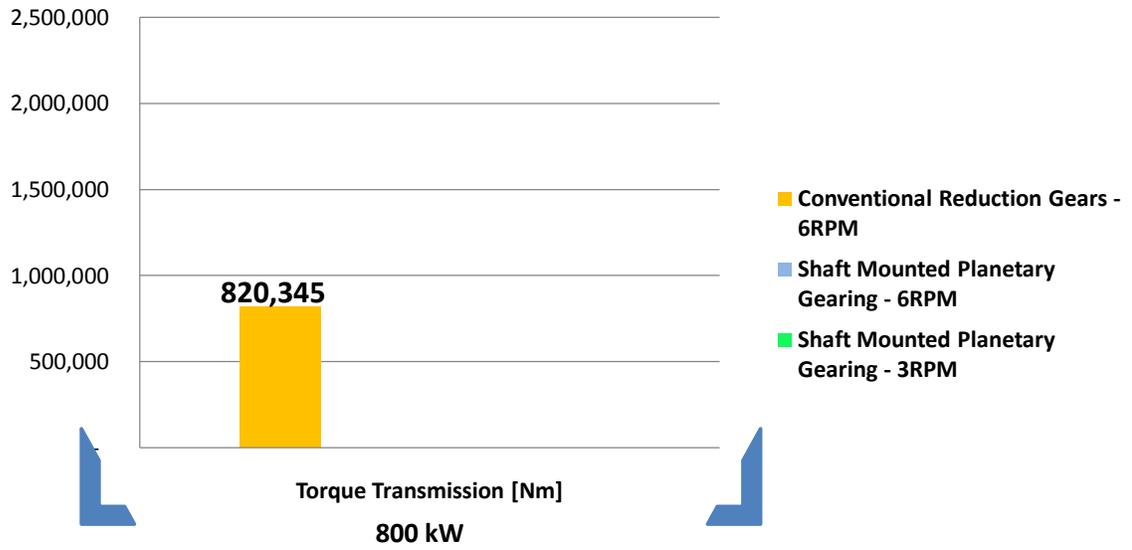
Stage 2 - Shaft Mounted Planetary Gearbox	760	96%	730	163	6	1,161,766
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Output RPM – 3 – Slow Speed Milling

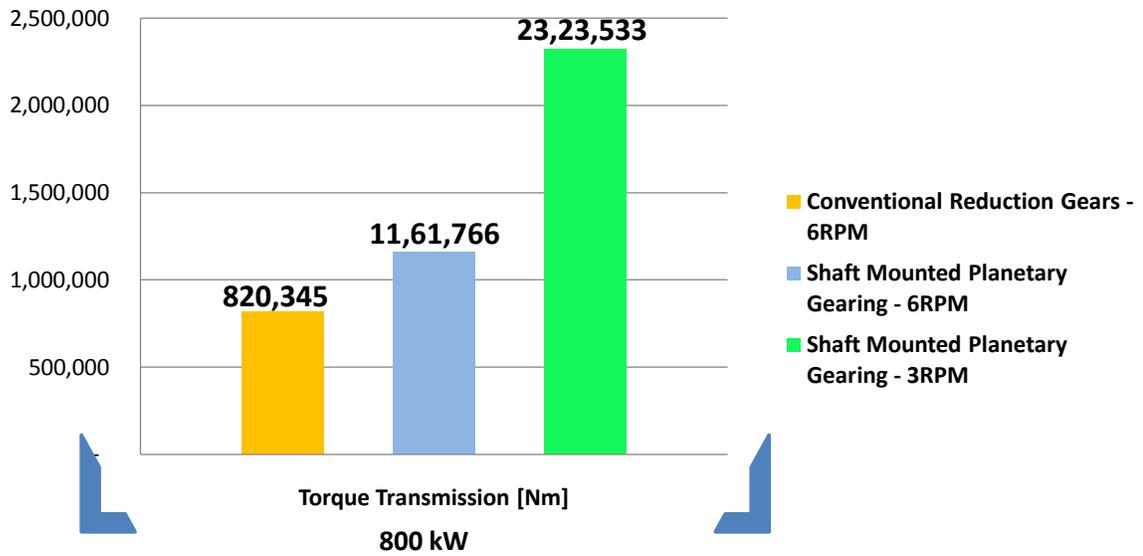
Stage 2 - Shaft Mounted Planetary Gearbox	760	96%	730	327	3	2,323,533
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SHAFT MOUNTED PLANETARY GEARBOX

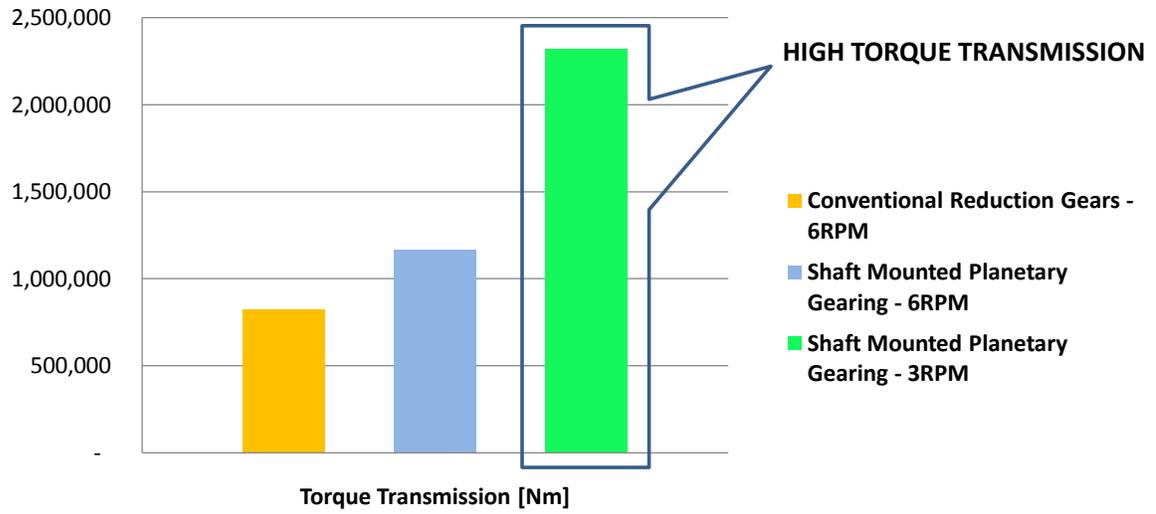
POWER / TORQUE TRANSMISSION



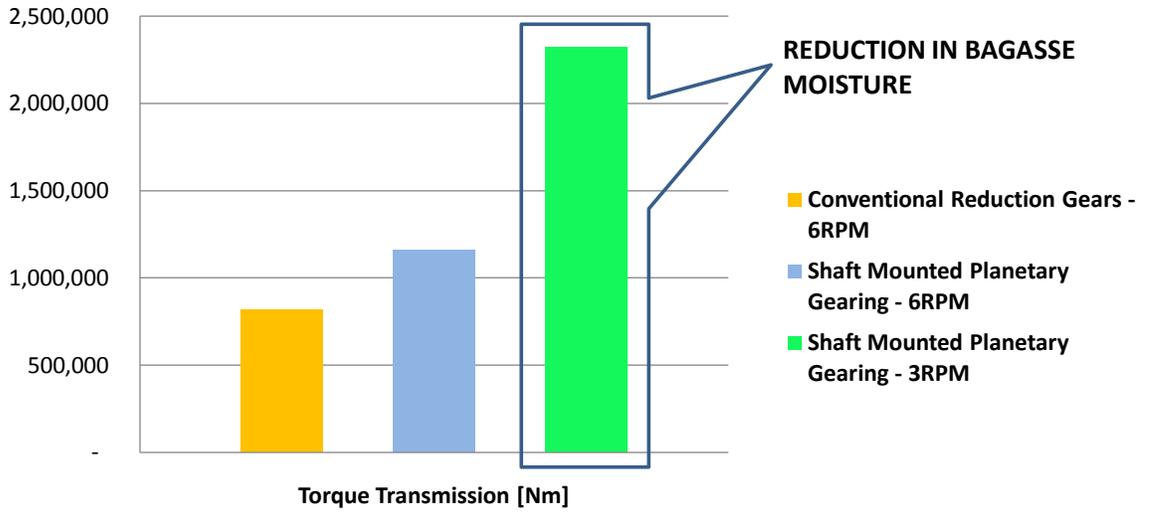
POWER / TORQUE TRANSMISSION



POWER / TORQUE TRANSMISSION



POWER / TORQUE TRANSMISSION



**ECONOMY – SHAFT MOUNTED
PLANETARY DRIVE**



**QUANTITY OF
LUBRICANT USED**

**20 NOS.
PLANETARY
GEARBOXES**

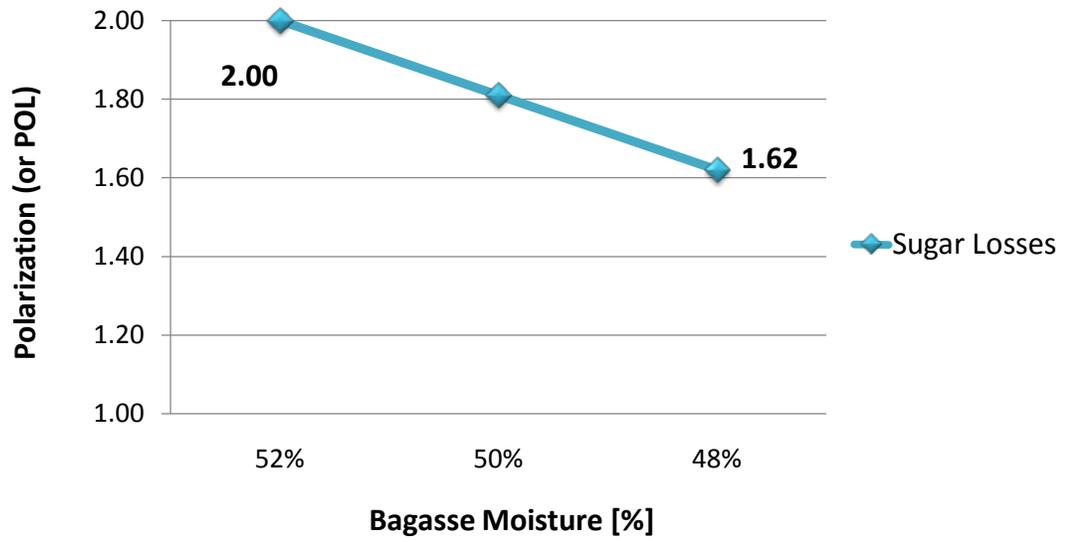
**140 LITERS x
20 NOS.**

**ECONOMY – SHAFT MOUNTED
PLANETARY DRIVE**

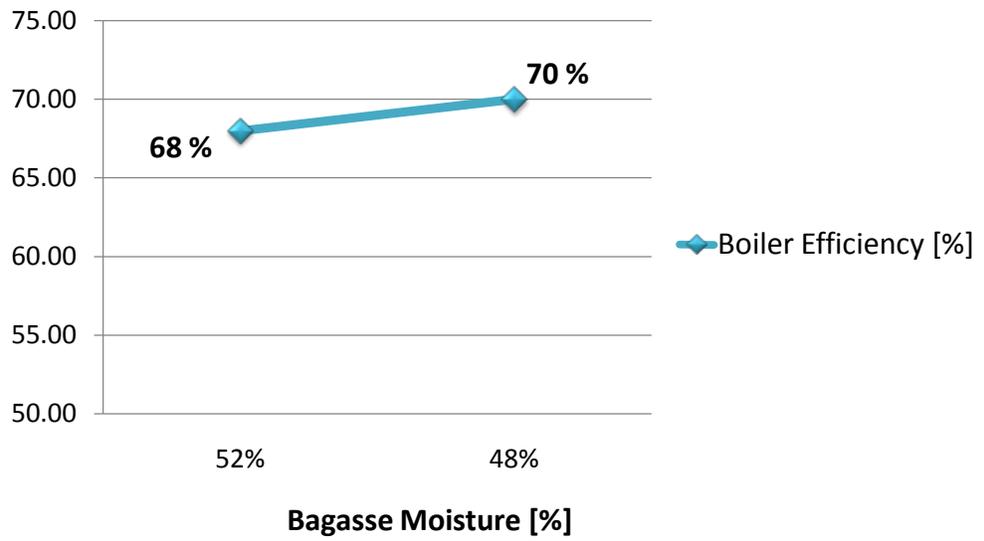
**AFTER ONE CRUSHING SEASON, THE LUBRICANT TO BE USED SHALL
BE 3 – 4 LITERS PER GEARBOX**

THEREFORE, THE COST INCURRED SHALL BE NEGLIGIBLE

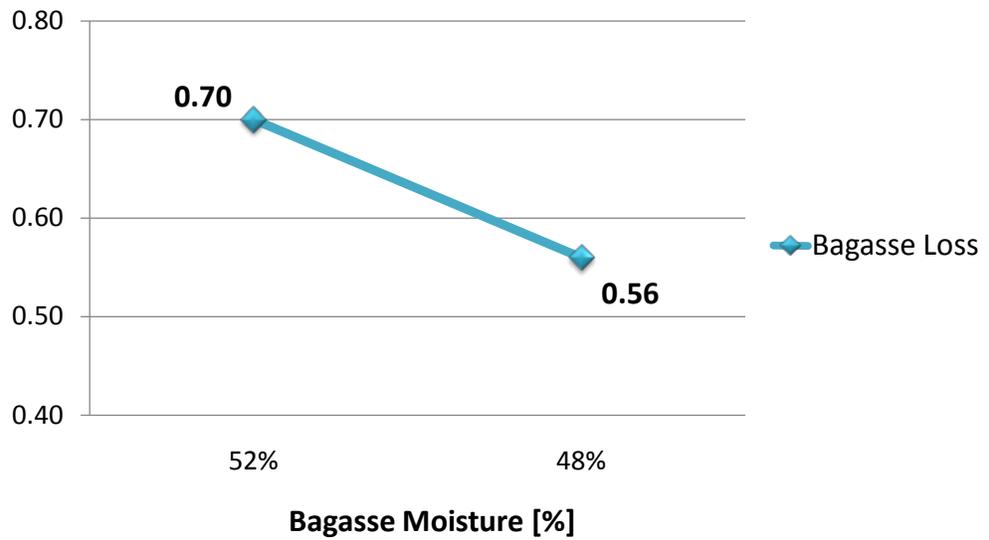
REDUCED SUGAR LOSSES



INCREASED BOILER EFFICIENCY



REDUCED BAGASSE LOSSES



ADVANTAGES – SHAFT MOUNTED PLANETARY GEARBOX



ADVANTAGES – SHAFT MOUNTED PLANETARY GEARBOX



CONCLUSION

Pinionless Mills with Shaft mounted Planetary Gearboxes are working satisfactorily for Years

CONCLUSION



Shaft Mounted Planetary Milling Train is an efficient and economical solution and consumes only **1kW-hr / Ton of Cane / Mill** and has capability to expand Plant capacity up to 100%

OPERATING RESULTS

Crush Rate	250 TPH
Energy Consumption	Only 1.1 kW-hr / Ton of Cane / Mill
Bagasse Moisture	49% with 3 mills in operation

Negligible wear on mill roll journals and bearing liners even after completion of 4 crops

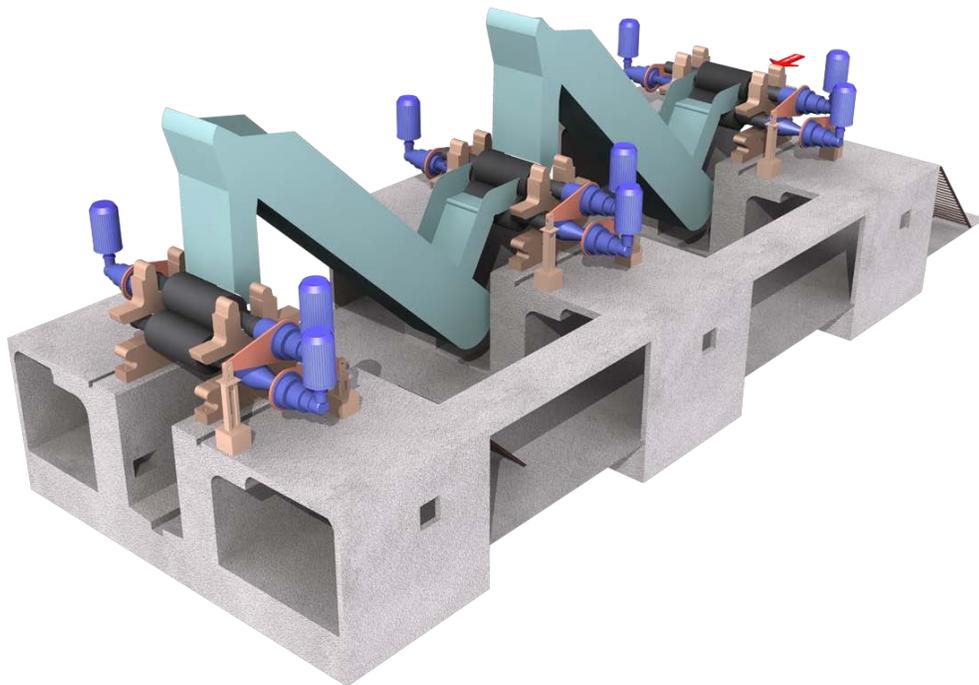
Paper presented at:

SHAFT MOUNTED PLANETARY DRIVES



42" x 84", 4 ROLL MILL: JAY MAHESH SUGAR, INDIA

Paper presented at:



THANKS FOR YOUR VALUABLE TIME