

Impact of Head on Cutter on Milling Performance and Crushing Enhancement

A.A. Beig, Rohit Gupta* and Sandeep Srivastava

Received : May 22, 2024; Accepted : June 18, 2024

ABSTRACT

This is an attempt to enhance the through-put and milling efficiencies from the existing milling tandem. The degree of cane preparation has direct influence on the milling capacity and its efficiencies. This study details on how the performance of existing milling tandem can be enhanced by increasing the degree of cane preparation from 87%+ to 88.50%+.

Keywords: Head on cutter, cane preparation, cane crushed, mill extraction, power consumption, fibre % cane, bagasse moisture and pol % bagasse.

INTRODUCTION

As we all know that cane preparation has a significant contribution on improvement of mill capacity and mill efficiency like pol % bagasse and bagasse moisture. Its a proven fact that the increase in preparatory index increases the bulk density of prepared cane. Hence, we

decided to modify our cane handling and preparation layout by incorporating the head on cutter (HOC) on Aux cane carrier to obtain the desired increase in throughput, overall extraction and reduction in pol % bagasse and bagasse moisture from the existing juice extraction devices-Milling Tandem.

OLD CONFIGURATION OF CANE PREPARATORY DEVICES

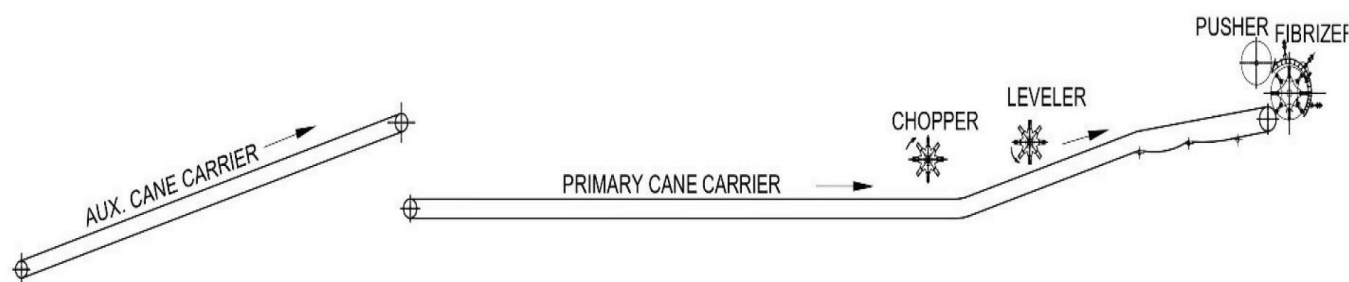


Figure 1 : Old configuration of cane preparatory devices, season 2022-2023

As detailed in Figure 1, in our old configuration system we had cane chopper, cane leveller and fibrizer as cane preparatory devices. The maximum PI obtained from this configuration was 87%+.

As detailed in Figure 2, in our new configuration system we have installed cane kicker, head on cutter on aux cane carrier with existing preparatory devices

like cane chopper, cane leveller and fibrizer at primary/main cane carrier. To accommodate the installation of HOC and kicker on aux cane carrier, we have shortened the length of primary/main cane carrier by 15 mtrs. Reduction in length of primary/main cane carrier was compensated by higher bulk density obtained from HOC. The maximum PI obtained from this configuration was around 89+.

*Corresponding Author email: gupta.rohit@dalmiasugar.com

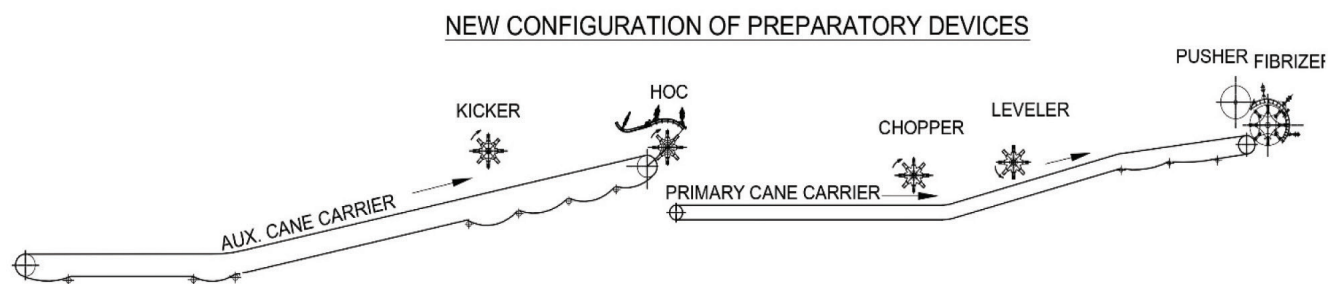


Figure 2 : New configuration of cane preparatory devices, season 2023-2024

Images appended below are actual output received from head on cutter installed at aux. cane carrier. This

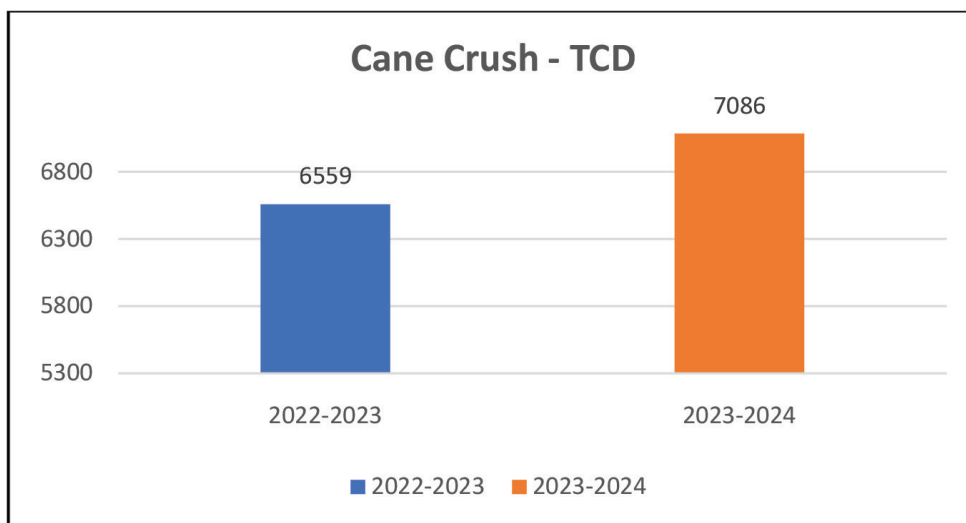
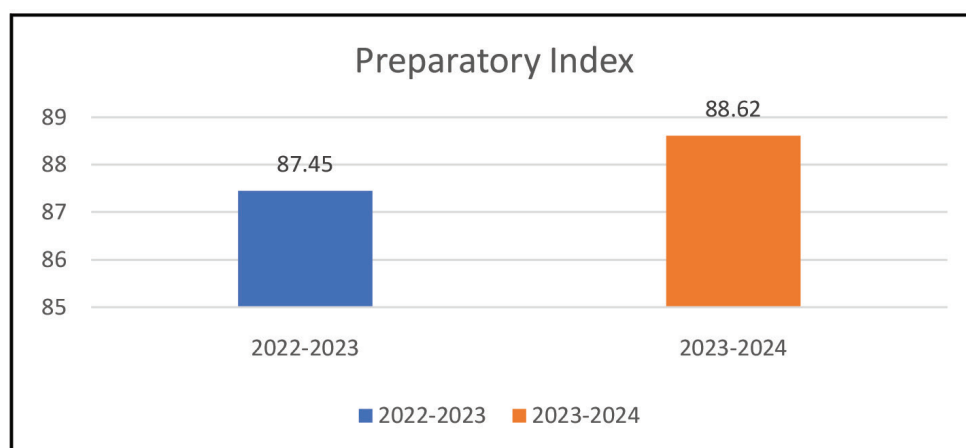
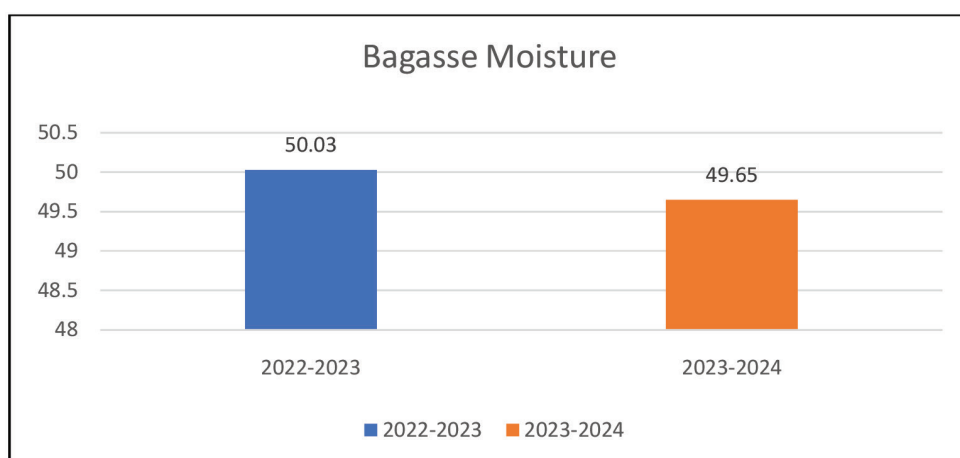
clearly indicated that the bulk density has increased many folds comparing to uncut cane.



Figure 3 : Output of cutter installed at factory

With the new configuration arrangement, we were able to achieve 54+ PI from head on cutter installed at aux cane carrier. This has resulted in reduction in

power consumption at remaining preparatory devices installed at primary/main cane carrier also. The final PI has been in the range of 89 against from range of 87.

**Figure 4 : Cane crush TCD****Figure 5 : Prepating index****Figure 6 : Bagasse moisture**

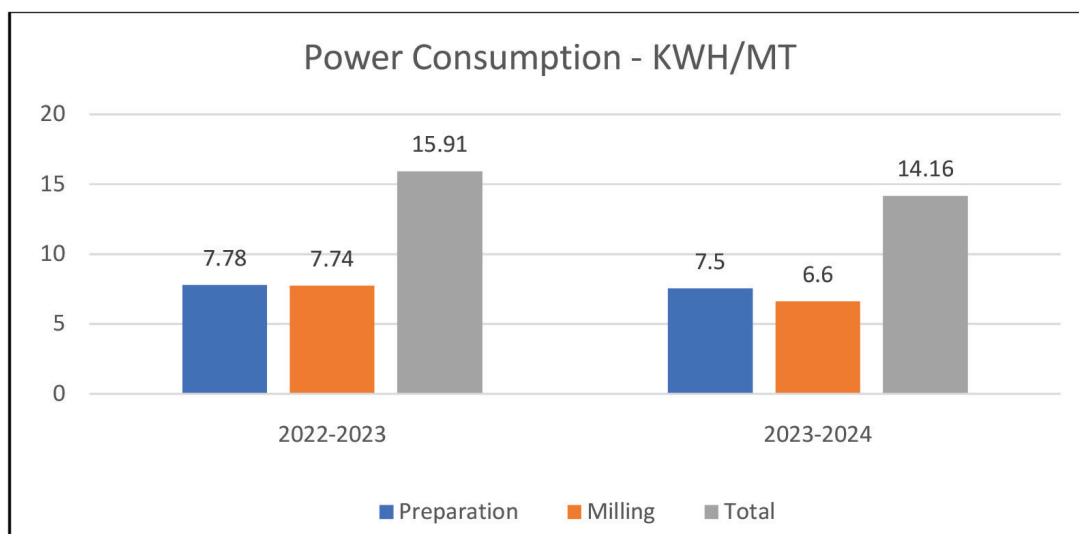


Figure 7 : Power consumption (KWH/MT)

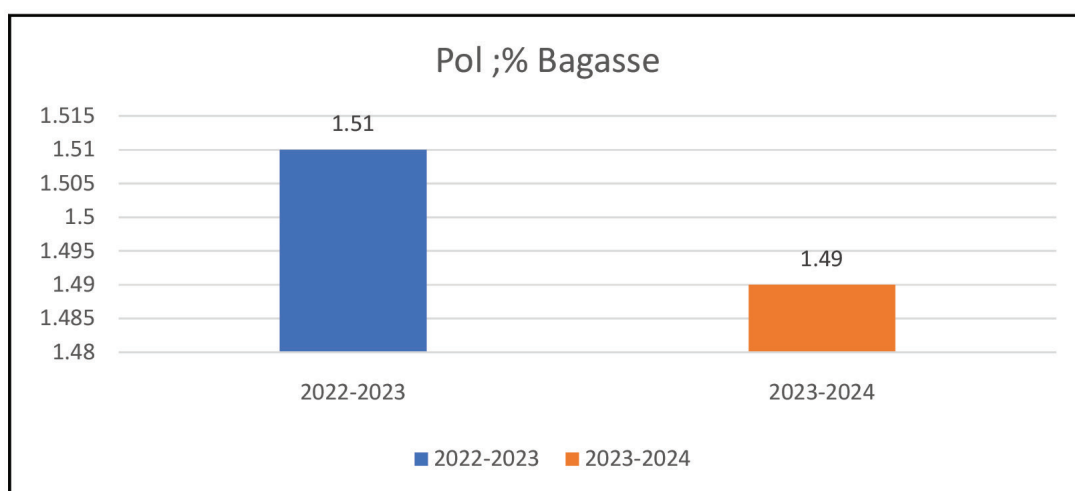


Figure 8 : Pol% bagasse

Table 1 : Results of performance and savings

Sl. No.	Performance Indicator	2022-2023	2023-2024	Savings – Rs. In Lacs
1	Cane Crushed – Lac MT	11.86	11.04	
2	Bagasse Pol	1.54	1.49	
3	Bagasse loss	0.43	0.40	100
4	Bagasse Moisture	50.04	49.47	60
5	Power saving KWH/MT	15.52	14.16	52
			Total Saving	212
			Total Investment	370
			ROI	1.75 season

Comparison of Performance

Comparison of best 10 days of operation are graphically illustrated as below.

Effect of Improved Cane Preparation on Milling Efficiencies

For an efficient milling a higher opening of the sugar-containing cells has great impact on the primary extraction and a lower bagasse moisture and bagasse % pol.

CONCLUSION

It is now an established fact that fine cane preparation is the key to efficient milling as it exerts influence on mill extraction as well as throughput. Fine preparation demands for higher power requirement for the preparatory devices, but results in reduction of power consumption at mills. Cane preparation is the most important variable affecting extraction. If

high extractions are to be achieved, it is essential that the cane is prepared so that maximum of the sugar-containing cells of the cane are ruptured. Ideally the type of preparation should result in material where all the cells are ruptured but long fibers are available, which will result in a continuous cane bed due to higher bulk density.

ACKNOWLEDGEMENT

We are very much thankful to our top management and to all our colleagues, senior and juniors who have supported during preparation of this paper.

REFERENCES

- Hugot, E. (1986). Handbook of cane sugar engineering. Sugar Industry International, Berlin.
- Rein, Peter (2007). Cane sugar engineering. Sugar Industry International, Berlin.