

Reduced power consumption and improved productivity at Indian sugar mill

The installation of a 750 kW VLT® AutomationDrive on the main mill has reduced power consumption significantly and improved productivity for JHV Sugars Limited at Padrauna, Uttar Pradesh, India.

Running and maintenance costs are significantly reduced due to the simplification of control requirements and the replacement of a turbine with a standard squirrel-cage induction motor, and Mr. M. K. Biswas, the Group Head of the JHV Group, has expressed his satisfaction at the outcome and is considering replacing the remaining three turbine driven mills with motors and VLT® drives.

Replacing steam turbine

JHV Sugars Limited, a reputed manufacturer of cane sugar with business interests in distilleries, decided to place a Danfoss VLT® drive for a mill crusher in their plant. The decision was part of a modernisation programme aimed at replacing the steam driven turbine with AC motors and drives. The order also included a 225 kW drive for the ID Fan and a 90kW drive for the juice pump.

Vast experience

Key reasons for choosing Danfoss were its vast experience with supplying drives for various applications in sugar plants and the positive feedback from other customers in the industry regarding the performance of VLT® AutomationDrive and Danfoss' ability to provide quality application knowhow and service at short notice. The Main Mill drive was installed and successfully commissioned in February 2008 during the crushing season, along with the other drives. Its performance to date has been entirely satisfactory.



Excellent overload handling

Due to the varying load requirements and the high overloads experienced during cane crushing, the mill drive is usually specified for an overload duty corresponding to IEC Class IV or Class V.

The requirements of these duty classes are as detailed below:

Class IV:

100% Continuous, 125% for 2 hours and 200% for 10 seconds, where the base load (torque) is 100%.

Class V :

100% Continuous, 150 % for 2 Hours and 200 % for 60 seconds.

Considering Class IV duty with overloads already factored in, the continuous rating of the drive motor was specified as:

Continuous capacity:	750 kW.
Operating Voltage:	415 V ±10 %
	50 Hz ± 5 %.
Synchronous Speed:	1000 rpm
Rated Current:	1303 A.

Since the motor rating was specified with overload, the drive continuous rating was matched with that of the motor. The choice fell on the VLT® AutomationDrive, model FC302P800T5 with a constant torque rating of 1460 A and an overload capacity of 150% for 1 minute.

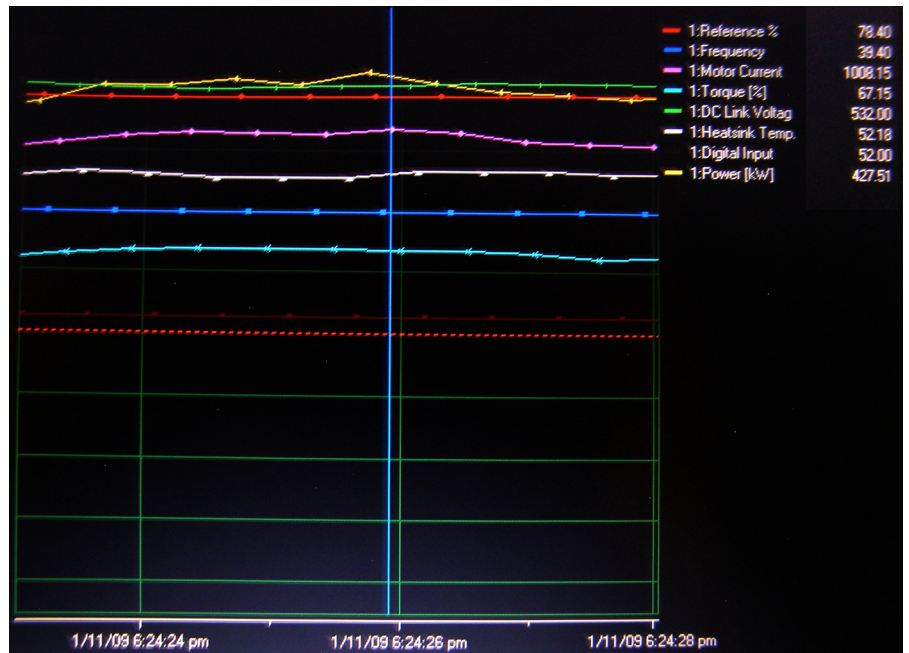
Fully tested

The F Frame drive was fully tested with the locally manufactured in-comer ACB panel prior to dispatch to site. The newcomer's apprehensions regarding the drive performance were laid to rest once the load trials were successfully conducted in February 2008.

Positives

Many positives accrued from the installation of the drive system and motor:

- 20 % lower start torque**
 Due to the acceleration ramp function in the drive, it was now possible to set an appropriate ramp up time (90 seconds) and ease the starting requirements on the mill with the existing diesel generator set. The power consumption requirements during mill start were significantly lowered, the reduction being $\approx 20\%$.
- Current within motor ratings**
 Operation in VVC+ Control mode resulted in good speed holding characteristics and ability to handle the overloads encountered during normal running of the mill. An examination of the key parameter plots shows that the maximum drive current (monitored using the MCT-10 drive software's trending feature) during crushing is 1008 A, which is well within the motor and drive FLC ratings.
- Simplified control requirements**
 Mill speed is now controlled by adjusting the motor frequency instead of steam flow control with flow control valves as was the case with the turbine. The control requirements are thus considerably simplified.



- Maintenance costs lowered**
 With the introduction of a standard squirrel-cage induction motor, the running costs on account of maintenance have been significantly lowered.

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