ME800 MV Drives Cement Industry Solutions

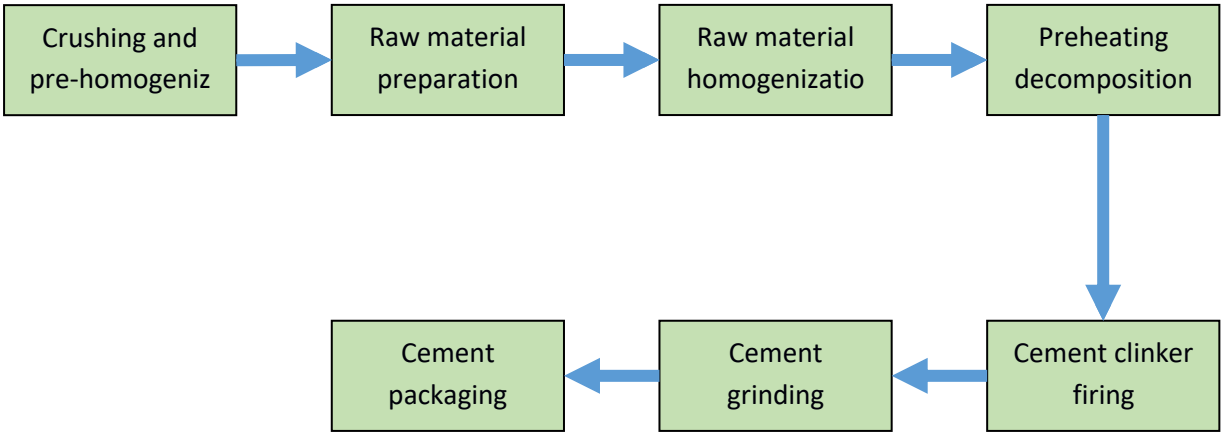
Summary

Cement industry is a big energy consumer therefore cement production enterprises must reduce energy consumption through various ways to obtain the best economic benefits and the highest labor productivity. The application of STEP ME800 MV drives in the fan of Chongzheng Cement Group Co., Ltd. is for the purpose of energy saving and consumption reduction. At the same time, the operation reliability of the equipment is improved by using MV drives for speed regulation.

Key words: MV Drives, Cement, Industry Fan, Energy saving

1. Cement production process

The main cement production process is as follows:



2. Project introduction

The production scale of Chongzheng cement plant is 1 million tons/year. The company now has a 2000t/d new dry rotary kiln cement production line transformation project using DCS microcomputer automation control. All fans of this line are controlled by STEP ME800 series MV frequency Drives.

The main fans in the production line are briefly described as follows:

- High temperature fan

  The high temperature gas (above 200 degrees) after combustion in the kiln tail and

furnace is drawn by the high temperature fan into the five-stage preheater. Raw materials and pulverized coal from the top, through the first to the fifth stage of the preheating, the pulverized coal and raw materials temperature is very high in the fifth stage, and then go into the furnace began to burn violently. The calcined melt enters the rotary kiln, carbon monoxide and other gases return to the preheater. The high temperature gas is drawn by the high temperature fan into the waste heat power generation equipment. The gas temperature after waste heat generation is still relatively high. After being cooled down by the humidifier, one part goes into the raw material vertical grinding miller, and the other part goes into the cloth bag dust collector for recycling.

- Circulating fan

Raw materials grinding miller is also vertical grinding miller, grinding after the first stage of crushing limestone and other auxiliary ingredients, grinding into the required raw materials powder, after the powder sorting machine, the qualified raw materials powder is taken away by the circulation machine, the unqualified raw materials will go back to the raw materials grinding miller to re-grinding. The qualified raw materials gas enters the 4 level cyclone cylinders. A large quantity of raw materials sinks into the hopper under the cyclone cylinder, and is transported to the raw materials warehouse through the belt conveyor. Other gases containing a small amount of raw material are mostly fed into the bag collector by the circulation fan. The raw material recovered from the bag collector should also be sent to the raw material collector. The gas not enter the bag dust collector is recycled by the circulating fan and go back to the raw material grinding miller to recirculate. After filtering the raw material, and then recycle back to the raw material grinding miller.

3. MV Drives solution for control system

3.1 Motor technical parameters in customer side

1)High temperature fan

Voltage：6KV

Rated power：1250KW

Rated current：151A

2)Blower

voltage：6KV

Rated power：1250KW

Rated current：151A

3)Kiln head induced draft fan

voltage：6KV

Rated power：1000KW

Rated current： 114A

4)Kiln tail exhaust fan

voltage：6KV

Rated power：315KW

Rated current：35A

3.2 MV Drives selection

Load name	Drives model	Rated power(kW)	Rated current(A)
High temperature fan	ME800-1250-TO6-PA	1250	154
Blower	ME800-1250-TO6-PA	1250	154
Kiln head induced draft fan	ME800-1000-TO6-PA	1000	120
Kiln tail exhaust fan	ME800-0315-TO6-PA	315	38

3.3 Site overview

Disadvantages before transformation:

1） Serious waste of electric energy；

2） Poor adjustment accuracy；

3） Starting current has a great impact on the power grid；

4） Motor and fan speed high, load heavy；

5） Big mechanical impact when starting, low service life of equipment；

6） Big noise, serious dust pollution.

Several problems that customers are worried about when transforming Drives:

1) The "collapse" problem from the high temperature fan's pipeline causes the motor overcurrent;

2) Harmonic pollution of the power grid;

3) Energy saving effects;

4) The stability and maintenance of MV Drives equipment.

STEP MV Drives has the following characteristics to solve the shortcomings of customer's equipment, eliminate the customer's hesitate, the field measurement of electricity saving rate at 20%-35%.

- STEP ME800 MV Drives adopt 18/30/54 pulse rectifier which can effectively suppress the high harmonics;
- Adopts the multi-level PWM control mode, the output waveform is closest to the sine wave, greatly reduces the torque pulsation of the motor;
- Small common mode voltage and dv/dt, no special requirements on the motor and cable. Old equipment conversion application, no need to replace the motor;
- STEP ME800 MV Drives support the speed tracking start function, in the case that the motor is not completely stopped, Drives can be convenient to start the motor again, improve the production efficiency;
- STEP ME800 MV Drives can be used for positive and negative compensation of high frequency and low frequency. Strong adaptability to various loads; The VF curve can be customized according to the field conditions;
- The reference wave changes from sinusoidal wave to sinusoidal wave plus third harmonics, increasing the output by 5-10% at the same frequency
- Control power supply is equipped with user three-phase 380 VAC power, and standby transformer three-phase 380 VAC power. When the power supply is cut off, the system will automatically switch to the standby power, so that the Drives can continue to run normally;

- When STEP ME800 MV Drives is in operation, the high voltage instantaneous power loss can continue to output 2S. During this period, the Drives can resume normal operation if the high voltage power is restored；
- The touch screen interface can display the output current waveform of the Drives in real time and the real-time running curve of the equipment；
- Bus voltage self-equalization technology to prevent the occurrence of unit overvoltage fault caused by too fast deceleration process.

MV Drives Field Debugging