

Continuous Bagasse Feeding System

Brief Description of the System

The continuous bagasse feeding system consist of three major parts. The system is designed for each specific boiler capacities. The size of the bunker, the dimension of the extractor, spike pitch, screw length and flight pitch are varied for case to case. A well designed system gives smooth flow and good controllability range.

Continuous Bagasse Feeding System

Recognising the potential for Co-generation, sugar plants are expanding their capacities with installation of new high pressure boilers and / or modernisation of their existing boilers. New sugar plants are incorporating cogeneration plants in the original plant itself. Some plants have additional boiler capacities, using which only a turbogenerator of condensing type is added and the extra power generated is fed to the grid.

The modern high pressure boilers use either dumping or travelling grate with pneumatic distributors for bagasse / biomass firing, which ensures efficient burning. However, the amount of bagasse availability at any time on the grate inside the furnace is limited and bagasse feed should be continuously available to maintain the steam pressure / temperature in the boilers.

Presently, in the sugar plants using high pressure boilers, bagasse is fed directly from the mill which causes frequent boiler steam outlet pressure / temperature fluctuation even due to small fluctuations in crushing. These fluctuations in steam pressures / temperature affects continuous power generation in Co-generation plants, especially when the plant is connected to the grid. During mill stoppages, there is a time lag before bagasse is back fed and in this period the boiler pressure decreases causing drop in turbine inlet steam condition which interrupts the power generation.

To Overcome The Above Problem, Avant-Garde Has Engineered A Bagasse Storage-Cum-Feed System To Ensure Continuous Feed Of Bagasse To The Furnace In Order To Maintain The Steady Steam Parameters From The Boiler .

Bunker

The return bagasse carrier feeds bagasse into the bunker. The bunker is generally divergent towards the bagasse extractor to allow free flow of bagasse. The height and other dimensions which decides the storage capacity of the bunker depends on the elevation of the return bagasse carrier available in the plant. Generally the storage achieved varies between 4 minutes to 20 minutes for various configurations.

Bagasse Extractor

The bagasse extractor (feeder) extracts the stored bagasse from the bunker and feeds it to the screw conveyor below. The extractor is of rotary drum type with spikes on the drum. The centre of the drum is eccentric with the bunker. This is to prevent the column load of bagasse in the bunker directly acting on the drum. The drum is rotated by a variable speed drive arrangement. The HP and speed of the drive will vary depending upon the capacity required. Depending on the configuration the HP of the drive system has either been 5 HP or 7.5 HP.

To ensure controllability, suitably shaped knife edged control plates are introduced in the space between the extractor drum and the side plate. For better appreciation of the system photographs depicting the general arrangement are attached.

Screw Feeder

The screw feeder feeds the bagasse from the outlet of the extractor and conveys it to the mouth of the mechanical / pneumatic distributor for bagasse. The screw feeder is rotated at constant RPM with a drive arrangement. Depending on the capacity of bagasse to be handled the RPM will vary.

The Advantages / Benefits of the System are as follows:-

1. Ensures Uninterrupted steam supply from boiler at steady parameters.
2. Reduction of unburnt carry over problems due to less load changes.
3. Increased life of boiler pressure parts due to reduction in fluctuation of operating parameters.
4. Reduction in mental and physical fatigue of boiler operators due to improved bagasse feeding system.
5. Increased life of steam turbine due to reduction in thermal shocks. This is because the steam parameters are maintained more or less uniform by the system.
6. The system makes it possible to hook up automatic combustion control system which maintains optimum efficiency / performance of the system.

The continuous bagasse feeding system has been successfully installed and has been operating for many years in the following plants.

1. M/s.MRK Co-op. Sugar Mills Limited
2. M/s.Cheyyar Co-op. Sugar Mills Limited
3. The KCP Limited, Lakshmipuram
4. M/s.Agauta Sugars and Chemicals Limited

A copy of certificates from MRK and Agauta Sugars is enclosed herewith. Recently, we have engineered and supplied similar systems to the following sugar mills where they are operating successfully:

1. M/s.EID Parry (I) Ltd, Tamil Nadu
2. M/s.Thiru Arooran Sugars Limited, Unit- I, Tamil Nadu
3. M/s.KCP Mayura Sugars Limited, Andhra Pradesh.

Conclusion

Continuous Bagasse feeding system has proved its worthiness and has become essential for all cogeneration plants exporting power to the grid. This system can be extended to feed other Bio-mass fuels with certain modification. The Bio-mass based power plants should be incorporated with this system for its steady operation. The system design is site specific and duplication of the system even to adjacent boilers in the same site can cause problems and hence not advisable.

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