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Cross-Belt Elemental Analyzer





Company Profile

Situated in Dandong, one of the most beautiful border cities in China, Dandong Dongfang Measurement & Control Technology Co., Ltd., hereinafter referred to as DFMC, is one specialized mine automation engineering company as well as a large instrument manufacturer which is the largest in China, occupies over 90% market share in the field of mineral processing automation that has been implemented. At present, we have over 1,000 engineers all over the world.

Since established in 1996, we already have 12 kinds of internationally advanced online measuring analyzers and more than 100 measurement and control systems which were independently researched and developed. With the technologies covering GPS guidance, PGNA, XRF, ultrasound, infrared, micro-wave, radar, etc. DFMC utilized hundreds of applications in metallurgical, mine, cement, building materials, chemical, coal and other industries.

DFMC is committed to helping clients to realize high quality, high output, energy-saving and consumption reduction to achieve sustainable development for a better world.

Product Principle

Cross-Belt Elemental Analyzer adapts the Prompt Gamma Neutron Activation Analysis technique usually referred to as PGNA. The neutron particles emitted by the neutron source impact with the elements in coal to produce inelastic scattering and capture reaction, thereby the intercepted atomic nucleus reached an excited state. Subsequently in the process of de-excitation, the excited atomic nucleus emits γ rays with different energy and intensity, which are characteristics of individual element. The energy of the characteristic γ rays is detected to identify the types of elements in the material, and the element content is obtained by detecting the intensity of the specific energy gamma rays.

Technical Application

1. Classified Stacking

Cross-Belt Elemental Analyzer system can be used in combination with the process control system to classify and stack the raw coal & incoming coal to plant. For the coal washing plant, the coal with high calorific value can be sorted out to maximize the output of high-quality coal; for the power



Product Overview

Cross-Belt Elemental Analyzer is an online cross-belt type coal quality detection device. It has great significance for coal mining, coal washing, coal blending and facilitates in production process control in coal mining, coal washing and coal blending

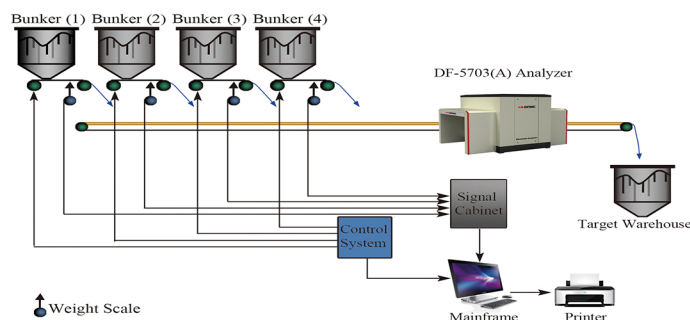
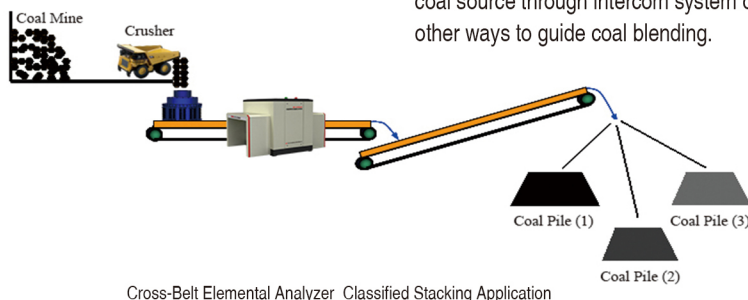


plant and coal chemical industry, the coal can be classified and stacked according to the quality, which is conducive to the subsequent stable coal blending.

2. Coal Blending

Cross-Belt Elemental Analyzer system can be used in combination with the automatic proportioning system to optimize the process control of coal blending. The weighing scale and analyzer keeps on sending cur-

results to the batching system on continuous basis. According to the target value of the user's quality control parameters (calorific value, sulfur content, ash content, and volatile matter, etc.), the batching system will give the optimized formula, and control the amount of feed for each raw material meet the quality control requirements. The batching system can also use manual mode to dispatch the feed quantity of each coal source through intercom system or other ways to guide coal blending.



Cross-Belt Elemental Analyzer Coal Blending Application



The specific application and effect of the analyzer in different fields are as follows:

1. Coal Preparation Plant

The analyzer is directly installed on the coal conveying belt to detect the whole coal flow. It can analyze the element content and industrial indicators of the materials passing through the belt in real-time and can classify and stack based on different quality according to the detection results, so as to maximize the production of high-quality coal.

Application effects: through real-time monitoring and controlling of ash content, sulfur content and other coal quality parameters of coal washing and preparation, the production of high-quality coal can be maximized. On the other hand, the real-time test data can adjust the separation parameters at any time, in order to improve the production efficiency, and ensure the stability and conformity of various indicators of commercial coal. For instance, under the condition of constant separation density, once the ash content is high in the monitoring, the amount of slack coal will be increased immediately, so as to reduce the ash content.

2. Loading Station

The analyzer is directly installed on the coal conveying belt of the loading station to analyze all indexes of coal quality on the belt in real-time. Based on the analyzed results, one can optimize the quality of loading coal by making use of various coal resources in a comprehensive manner & thereby reduce the cost in subsequent blending.

Benefits: Compared with the traditional mining and production, it helps adapting scientific approach to optimize coal blending through online analysis & thereby ensures the stability of product coal quality to meet customer requirement & avoid penalty.

3. Coal Chemical Industry and Port

EA-COAL can be used in incoming coal detection and coal blending process in coal chemical industry.

Incoming coal: the analyzer is installed on the incoming coal belt to detect the coal quality components on the belt online. According to the detection results, the control system will distribute the coal of different quality to different coal piles.

agement, and guide the follow-up stable coal blending.

Coal blending: the analyzer is installed on the belt conveyor, and the online detection results are communicated to the coal blending expert system. The expert system adjusts the ratio of each coal source in real-time and optimizes the coal blending based on the coal blending objective.

Application Benefits: It helps to improve & set coal quality through enhanced automation & reduces the labor cost & also maximizes the benefits of enterprises.



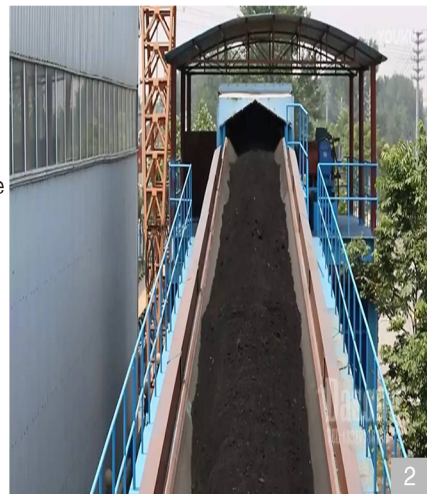
4. Coal-fired Power Plant

Cross-Belt Elemental Analyzer can be used in the process of incoming coal and burning coal in power plant.

Incoming coal: the analyzer is installed on the incoming coal belt to monitor the ash content, moisture content, calorific value, sulfur content and other indicators of coal quality in real-time. According to the test results, the control system will distribute different quality coal to different coal piles. Benefits: Provides timely and accurate data for power plant and coal yard management facilitate scientific management and guide the follow-up stable coal blending.

Burning coal: The analyzer is directly installed on the burning coal conveyor belt. According to the real-time test results, boiler designed coal and real-time operation experience, it provides direct guidance for the coal blending process, optimizes the coal blending process through the program control system, and ensures the stability of the burning coal in order to make the combustion coal quality meet the design requirements. The real-time coal quality data is provided to guide the boiler operation and avoid the abrupt change of coal quality which can cause the boiler to

cease fire, in order to realize safe burning. Application effect: through optimizing coal blending and reasonable collocation, to burn less high-quality coal, improve utilization rate of low-quality coal and reduce coal cost; to make the blended coal more stable and uniform, optimize boiler combustion, improve combustion efficiency, reduce boiler unit equipment failure, and improve the safety and economy of equipment operation; to monitor boiler indexes to avoid slag coking; to control the emission of pollutant to ensure sulfur emission meets environmental protection requirements and avoid excessive emission.





Advantages of classified stacking:

- To sort out coal with high calorific value to the maximum extent
- To increase high quality coal production
- To improve the scientific management level of coal yard
- To improve the level of production automation
- To reduce laboratory labor intensity

Advantages of coal blending:

- Reasonable utilization of various coal resources
- To stabilize coal composition and reduce fluctuation
- To control coal cost
- To control the sulfur emission to meet the domestic standard
- To guide operation and optimize combustion
- To improve the safety and economy of boiler operation

Product Feature

Comprehensive: Detects all passing materials, quite representative;
Fast: Provides analysis data per minute;
Effectivity: Provides key parameter data for production in order to conduct effective control;
Stable: Double loop temperature control, automatic spectrum stabilization, long-term stable operation.

System Function:

- Monitors the fluctuation of ash content, sulfur content and other indexes of coal flow on the belt online in real-time.
- Provides real-time rolling, cumulative, and historical data query, and printable report ; the analyzer has a database and historical query function, and can carry out statistical average query and report printing in any time period of one minute, ten minutes, one hour, eight hours, one day, etc..
- Conduct constant temperature control function of detector, electrical control cabinet and other key components to ensure that the key components are not affected by the change of temperature and humidity on site;
- Possess automatic alarm function on equipment fault and data error, to prompt the operator in time;
- Possess emote diagnosis function, convenient for remote service and troubleshooting.

The prime advantages with DFMC & its product as compared to others are:

- In house resourceful R & D team dedicated to constant development & up gradation.

- An extended service network & professional service team with hundreds of engineers to provide E&C services, after sales services etc.
- All key components that determine the performance of the online analyzer are imported from international reputed manufacturers.
- Applies optimized software algorithm to have stronger on-site adaptability which has more advantages in quality control and operation management of central control personnel.
- Utmost commitment to minimize stray radiations - radiation protection of the device is designed in strict accordance with the International standard (IAEA), using materials with strong radiation absorption capacity, thick body protection which makes the instrument safer and more reliable to use.
- DFMC has nearly two decades of experience in the development and protection of industrial nuclear testing instruments.
- The company has national radiation safety qualification certificate.
- The service is comprehensive, timely and effective. Lifetime technical services and software free upgrades will be provided to customer.

Application case: a power plant in India

An Indian company initially purchased 12 sets of Cross-Belt Elemental Analyzer through a single contract in 2017. All these analyzers are used for coal quality testing of burning coal. Online detection of coal quality data can be used to guide coal

blending process. In the control room, the operator can adjust the coal blending ratio of different grades of coal through the coal quality information displayed by the instrument, in order to ensure the quality stability & optimize boiler feeding. It helps to reduce

the cost of coal burning, excels the automation level of the power plant and eventually helps to improve boiler performance and also minimizes its maintenance. In view of the good effect, the company has placed order for six sets more Cross-Belt Elemental Analyzer successively.



Technical Parameters:

| | | | | | | | | | |
|--|---|--------|--------|--------|--------|--------|--------|--------|---------------|
| Physical Parameters | | | | | | | | | |
| Belt Width | 650mm | 800mm | 1000mm | 1200mm | 1400mm | 1600mm | 1800mm | 2100mm | Other sizes |
| Length | 2200mm | 2200mm | 2200mm | 2200mm | 2200mm | 2100mm | 2100mm | 2100mm | Customization |
| Width | 1900mm | 1900mm | 1900mm | 2100mm | 2100mm | 2300mm | 2500mm | 2700mm | Customization |
| Height | 1600mm | 1600mm | 1600mm | 1650mm | 1650mm | 1700mm | 1750mm | 1800mm | Customization |
| Weight | 2800kg | 2800kg | 2800kg | 3000kg | 3100kg | 3300kg | 3500kg | 3700kg | Customization |
| Bracket Angle | 30°~45° | | | | | | | | |
| Electron Device | | | | | | | | | |
| Signal Cabinet | Length=1100mm Width=770mm Height=300mm | | | | | | | | |
| Signal Cabinet Protection Level | IP65 | | | | | | | | |
| Power | 220VAC±10%, 50HZ±5%, 10A, 3-line (L, N, GND) | | | | | | | | |
| Environment | | | | | | | | | |
| Temperature | -30°C~50°C | | | | | | | | |
| Analysis | | | | | | | | | |
| Principle | Prompt Gamma Neutron Activation Analysis (PGNAA) | | | | | | | | |
| Neutron Source | Pulsed neutron generator or 252Cf neutron source | | | | | | | | |
| Measurement Parameters | Ash content, moisture, volatile matter, sulfur content, SiO2, Al2O3, Fe2O3, CaO, TiO2, Na2O, K2O, C, H, O, etc. | | | | | | | | |
| Calculation Parameters | Calorific value, ash melting temperature, volatile matter, H and any possible parameters can apply empirical equation | | | | | | | | |
| Analysis Time | 1 minute, user configurable | | | | | | | | |
| Communication | | | | | | | | | |
| Protocol | OPC, network service | | | | | | | | |
| Signal Cabinet to Host (customer provides) | optical fiber, special requirements depend on distance | | | | | | | | |