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AUTOMATED CONTROL OF AIR-DUST MIXTURE PARAMETERS DURING THE GRINDING OF CEMENT CLINKER

The production of cement requires intensive aspiration in the operation of cement mills to increase the productivity and preserve the environment because the dust emitted is hazardous to all living beings. Cement dust and its compounds have harmful effects on the respiratory system; excess exposure can lead to diseases in the upper parts of the lungs and negatively impact the skin and eyes. Prolonged interaction with the dust in the human body can result in chronic conditions such as respiratory tract inflammation and may lead to illnesses like influenza, bronchitis, tracheitis, and even certain forms of cancer. [1] Therefore, it is crucial to purify the air as soon as possible after the grinding of Portland cement.

The regulation of the air-dust mixture density before the aspiration shaft depends on its size. The velocity of the mixture within the shaft in the range of 1-1.5 m/s is allowed for the settling of one-fifth of the total dust and for creating normal conditions for further air purification in cyclones and bag filters. In the shaft, the mixture velocity enables the retention of one-fifth of the dust, establishing normal conditions for the subsequent air purification in cyclones and bag filters.

To assess the efficiency of aspirated air purification, a literature and patent search was conducted. As a result, a copyright sertificate was found. It is proposed to use a photodetector to determine the concentration of the air-dust mixture. [2] The operation of the photodetector is based on the photoelectric effect, comparing the amount of scattered light with the light passing through clean air. This sensor is suggested to be installed on the technological pipeline at various cleaning stages: before the aspiration shaft, after cyclones and after bag filters. Subsequently, all measurements are transmitted to the microprocessor controller MIK-52 and the computer.

By utilizing photodetectors and a hardware-software complex based on the microcontroller MIK-52 at different stages of aspirated air purification, control over the quality of purification can be achieved and the efficiency of the system in the production of Portland cement can be determined.

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