APPLICATION OF FUZZY CONTROL THEORY TO MINIMIZE THE POLLUTION DUE TO WASTE DUST EMMITTED BY THE CEMENT INDUSTRIES

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Cement industries of our country happen to be one of the major contributes of dust. The dust arising in various processing units of a cement plant varies in composition. The following types of dust can be distinguished.

1. Raw material dust [from lime stone, iron ore, gypsum, blast furnace slage],
2. Cement kiln dust [from exit gas],
3. Clinker dust [from cooler vent, clinker storage and handling],
4. Cement dust [from cement mills, packing house],
5. Coal dust [from coal handling and coal mill vent].

Cement kiln dust (CKD) has increased quite dramatically over the last few years. This dust is a waste product generated during the manufacture of Portland cement. In this paper the fuzzy control theory is used to reduce the cement kiln dust. In 1990, the national average was 9 tons of CKD generated for every 100 tons.
clinker production. The waste dust of cement kiln is sulphur, nitrogen, alkalis and chlorides of process in cement industries. The control of these waste dusts is very important issue, because of the following reasons:

1. This waste dust emissions of nitrogen and Carbon etc. are pollutants of the atmosphere,
2. The waste dust is affecting the smooth kiln operation of cement industry system and reduces the production of clinker quality.

Mainly this waste dust is created by the following three ways in cement industries:

1. Cement kiln dust when not collected in time and returned into the kiln cause air pollution,
2. Process instability and unscheduled kiln shutdowns,
3. Mixing of raw materials. We tackle this by step-by-step approaches using fuzzy theory in general and fuzzy control theory in particular to optimize the following:
   (a) CKD reprocessing,
   (b) Monitoring the proper control of waste gases let in atmosphere,
   (c) Optimization of mixing raw materials and fuels,
   (d) Burning zone of fuel combustion improvements by adoption of recent technologies from time to time,
   (e) Use of proper proportion of raw materials

By using fuzzy control theory we are sure to minimize the pollution created by the waste dust emitted by the cement industries.