

FEASIBILITY OF FABRIC DYE SLUDGE INCINERATION IN COAL POWER PLANTS

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Abstract

Largest income for the Sri Lanka is mainly from the apparel industry it counts for 5.4 billion \$ in the year 2021. Apparel industry is having mainly sewing factories and dye houses where dye houses mainly accounts for dyeing of garments. Water is the main medium used for the dyeing process and the excess dye pigments used for dyeing is resembled in the waste water which can be hazardous for the environment and animals. Hence the countries law forced the factories to purify the contaminated water by chemical or biological means and sets up standards for the same. The dye houses mainly use clarifier and filter press mechanisms to remove the dye pigments by water and the solidified pigments sent to the incineration process in the only cement factory in Sri Lanka. The Cement factory is situated in the Palavi Puttalam district and the countries only coal power plant also operated in the same region. The study is focusing the feasibility to use the coal boiler as an incinerator for the dried dye pigments which called sludge. The moisture content of the sludge can be varied from 65% to 0% and the test is carried out to see how the calorific value changes according to the moisture content of the sludge. Since the calorific value of the coal is comparatively higher than sludge the incineration process can affect the performance of the boiler and to overcome this issue mixture of the wastes which can be found in the apparel factories and coal dust is used along with the dried sludge. Number of mixtures are tested for the calorific value and mathematical relationship has derived from the results obtained from the tests for the calorific values of the mixtures. The inherited emission controlling systems are studied for the feasibility of controlling the SO_x and NO_x of the mixtures where it can be foresee the feasibility of controlling the same pollutants in the real world scenario.

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List of abbreviations

GCV	Gross Calorific Value
NCV	Net Calorific Value
MW	Mega Watt
ASTM	American Standards for Testing Materials
ICP MS	Inductively Coupled Plasma Mass Spectrometer
UPW	Ultra-Pure Water
RDF	Residue Derived Fuel
ESP	Electro Static Precipitator
FGD	Flue Gas Desulpherizer
GGH	Gas to Gas Heat Exchanger