A STUDY OF COAL TYPE SELECTION FOR A COAL FIRED POWER PLANT CONSIDERING COAL AND FLY ASH PROPERTIES

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Abstract. *In this paper, coal type selection for a coal fired boiler in a thermal power station is investigated. Available data of actually used coal types are too small compared with properties of coal type and fly ash. Classification of coal and fly ash properties is, hence, introduced and the coal and fly ash properties are consolidated into several categories through the factor analysis. Applicability of coal is evaluated by using the multiple regression analysis where the explanatory variables are the factor scores for respective categories. The proposed coal type selection method is applied to a boiler in a thermal power plant and its effectiveness is evaluated.*
Keywords: Coal type selection, Coal fired power plant, Category, Factor analysis, Multiple regression

1. **Introduction.** Many researches have been carried out on coal type effect to coal fired power plants [1]. In [2], the performance of a combined cycle pressurised fluidised bed combustion (PFBC) plant has been calculated, using the eclipse process simulator for a wide range of coal properties. In [3], desulphurization features of several coal types were investigated in a demonstration plant PFBC boiler. And the reference [4] provides insight into the ash formation mechanisms and coal characteristics responsible for the formation of fine ash.

Increase of applicable coal types to the coal fired power plants is preferable for stable supply of coals. In the present, final decision of the usage of the coal types has been made by a coal combustion test in a specific test furnace. The combustion test is, however, costly and time consuming. Hence, appropriate screening of the coal types by use of coal and fly ash properties in advance of the combustion test is much required.

Many decision making techniques have been proposed such as Bayesian decision making, decision tree [5] and an on-off decision making technique [6]. Decision making techniques are applied to various field such as tracking control of robot manipulators [7], and vehicle routing problem [8]. The Bayesian decision making requires appropriate a priori probability and the decision tree requires the probability and the expected value for each decision. And our on-off decision making technique is based on enough data of the human on-off decision making results. However, for the coal type selection problem, the available data