

ANTI-FOULANTS TO CUT DOWN FUEL COSTS

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Fuel oil is the most widely used fuel in local industries. Carbon, hydrogen, minor amounts of sulphur and other metallic compounds in the form of ash are the constituents of fuel oil. Different crude origins give rise to fuel oils with different combustion properties.

Because of incomplete combustion and varying quality of fuel oils unburnt carbon is always found as a major residual product in all oil fired heaters. Of this residual carbon a small fraction is carried away by flue gases to the atmosphere and a larger part remains inside as carbonaceous deposits. These deposits are found on all surfaces which are in continuous contact with hot flue gases. When deposited on heat transfer surfaces, these deposits and slags, reduce, heat absorption, area of gas passages, causing high draft losses and often hard firing is necessary during the second half of the heater operating cycle.

At the Petroleum Refinery, on a trial basis, an anti-foulant was introduced to one of the package boilers. This was introduced after a complete cleaning-maintenance shutdown. The injection was carried out into the combustion chamber (to the flame) for quick/efficient vaporization. This was done on a regular basis for a period of one year. Operating parameters of the heater, during the two cycles—with and without antifoulant — were compared to ascertain the benefits. The dosage has to be decided mainly on the quantity of fuel being fired and also on quality of fuel, fire-side conditions of the heater. Frequency of injection has to be found by the size and type of heater.

After introduction of the anti-foulant the following observations were made;

- (a) low stack temperature throughout the cycle

For a given steam load, 20°—30° C lower stack temperatures than that of previous cycle (without anti-foulant) were observed.

- (b) less soot blowing

frequency of soot blowing could be reduced to once a day from three times a day. Because of this less maintenance work on soot blowers and reduction in waste steam were observed.

- (c) low fuel consumption — (high boiler efficiency)

Steam/fuel ratio became high with the use of anti-foulant.

- (d) Reduced deposits on heat transfer surfaces.

After completion of the trial period of one year boiler was opened-up for inspection and was found that relatively small area of the heat transfer surface has been covered, with deposits and also the deposits were not hard as the deposits of the cycle without anti-foulant.

A cost benefit analysis was carried out to ascertain the savings. This was done on the basis of steam/fuel ratio. It was found that for the trial period of one year the net saving was Rs. 900,000. In addition to this fuel saving the manufacturers also claim that the anti-foulant has the capability of reducing Vanadium corrosion and Sulphur corrosion, which are quite common in oil fired heaters.

"The increase in the efficiency of energy utilization has been achieved without detriment to the prosperity of the nation — the axiomatic i.e. that used to exist in days gone by between economic growth and increased use of energy has finally become separated. An increased growth rate could therefore, in principle, mean a reduction in energy use. The strong correlation between energy conservation and acidification also becomes evident".

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