PROBLEMS IN THE APPLICATION OF PART II OF THE ATMOSPHERIC POLLUTION PREVENTION ACT (45), 1965

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The experience gained over the last two and a half years, in pinpointing the major problem areas, has also brought to light industrial processes where, often due to problems particularly associated with South African conditions, technological development has not reached the point where a practical, or economically acceptable solution to the air cleaning problem has been developed.

The simple grey iron cupola, of which there are some 300 in use in South Africa, emits an air volume of approximately 2,7 m^3/second of gas, or 900 m^3/ton of metal melted, at temperatures ranging from 500 to 1 200^{o} C and with a dust load of around 10 gm/m^3 or 10 kilo/ton of metal. Ranging in order of effectiveness, cleaning equipment like settling chambers, simple inertial separators, cyclones or bag filters can be considered if a dry means of collection is required. The first two are so inefficient that they can hardly be called collectors, while the latter two would cost more than ten times the price of the cupola.

The hot blast cupola, although basically the same, has a much finer dust, really a fume, with about 30% minus 1 micron and 50% minus 10 micron. Here only the bag filter can be considered efficient, but the cost must be borne in mind.

Very successful bag filtration plants have now been in operation for some time on arc furnace operations overseas, and a large plant was commissioned in South Africa some time ago. The lesson learnt from the past failures is that design must be liberal with respect to bag surface.

Any suggestions for dealing with Bessemer converters will be welcomed because to date none has been cleaned up that I know of.

The literature of the last year or two is literally cluttered with methods and installations for removing SO_2 from the combustion gases of large size boilers and power plant. On a careful reading, however, the cost aspect starts looming up and an indication of how high it is, can be found in the fact that economic evaluations of late often suggest that such installations only be run for a month or two in the year, when the weather requires drastic action.

The recovery of sulphur from sulphidic ore roasting operations sounds very attractive on paper, but when contemplating such installations, it is necessary to keep in mind that only the production of sulphuric acid holds reasonable promise, and then only if the converter operations can be planned to give a steady stream of SO_2. Technically, the recovery of elemental sulphur is possible but cost is rather high and this process can only be used in very special cases.

In the sweet business of sugar production, there is a dark matter of soot due to the incomplete combustion of bagasse. This by-product, containing on average 54% moisture, is used to raise steam but aside from being very light, it is not an ideal fuel. Work is at present in progress to find a solution to this problem.

When we come to the asbestos industry, there is no choice. Bag filters must be fitted to arrest all fibres as efficiently as possible.

Although the cement and lime industries are to some extent related, when it comes to the dusts they generate, there is a vast difference. The recovered cement dust can be returned to process but the lime dust is too high in silica and must be discarded. Adding to this the fact that lime has a lower unit price it is obvious that the same levels of control cannot be applied without adversely affecting the industry.

South Africa is richly endowed with chrome and manganese deposits but the conversion of these to marketable alloy products is a fume producing process and these fumes cause severe headaches to control authorities. The main features are high temperatures, small particle size and large gas volumes. Although it is technically quite feasible to clean the off-gas, the economics dictate caution.

I have intentionally dwelt on some of the problem areas of the fight against air pollution, not because I wish to propagate a defeatist attitude, but because it is essecntial that a task of this magnitude be tackled with caution lest the cart run away with the horse.