

THE BRITISH COAL UTILISATION RESEARCH ASSOCIATION

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The Internal Burning of Solid Fuels

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INTRODUCTION

It has long been known that charcoal could be "activated" by exposing it to oxidising gases at temperatures above 750°C., and this process is known to involve some degree of "internal" burning (so that the lump density of the product is less than that of the original material). So far, however, from it being recognised that the internal consumption of fuel particles plays an important part in technical fuel beds, the assumption is generally made that only the outermost layers of carbon are gasified, the particles diminishing in size in proportion to their loss in weight. It will at once be clear that the mechanical properties of a fuel bed - exemplified by the mode of travel down the shaft of a producer or of a blast furnace, the resistance of the bed to air flow and so on - will depend quite largely upon which of these two views is correct.

The evidence given in this Information Circular suggests that internal burning is the rule rather than the exception, both when blocks of fuel are burned at high temperatures under the impact of a jet of high velocity air and also in the milder conditions which prevail when the fuel is exposed to exhaust gases at intermediate temperatures.

In all the experiments described the fuels used had already been subjected to some process of carbonisation. None of the effects observed could, therefore, have been due to the disengagement of "volatiles" as ordinarily understood. Whilst it is believed that both the structure of the fuel and the presence of inorganic impurities have a determining influence on the extent of internal burning - and on the mechanical properties of the product - the data are insufficient to permit a generalisation at this stage.

The experiments described have been carried out at various times during the years 1944-9; this Circular is intended to present these piecemeal studies in a more coherent form.

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