

THE BRITISH COAL UTILISATION RESEARCH ASSOCIATION

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Some Simple Carbonisation Experiments  
Relevant to Gas Producers

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SUMMARY

Some laboratory experiments have been made to study the carbonisation of individual or small groups of particles under simulated gas producer conditions. The work constituted a preliminary step to direct experiments on the operation of leveller bars or associated mechanisms in fuel beds either in the combustion pot or on the industrial gas producer scale.

The conditions of carbonisation were as close as possible to those prevailing in the upper part of producer fuel beds, hot producer gas at pre-determined temperatures being used to heat the coal particles. The rate of temperature rise at different depths in the particle has been investigated. It was shown that a high-swelling coal has a lower heating rate than a non-swelling coal, and that the effect of moisture in coal is felt only in the early heating stages.

Agglomeration of small numbers of particles was studied and shown to be more severe for smaller sized particles. Curves were obtained showing for a single non-swelling coal how the carbonisation time is affected by temperature of carbonisation.

The mechanism of carbonisation under gas producer conditions is shown to include the formation on the particle of an outer coked layer which restricts swelling. The actual swelling is influenced by the rate of formation of this outer coked layer. Caking difficulties appear to be caused by cementation of particles through the exuding of tar oils to the particle surface.