

THE BRITISH COAL UTILISATION RESEARCH ASSOCIATION

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Corrosion Studies on a Model Rotary Air-Preheater

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SUMMARY

Tests have been carried out on a model rotary air-heater in an attempt to study, on a laboratory scale, corrosion phenomena under conditions similar to those experienced in industrial practice.

The acid dewpoint of the combustion gases used varied from 240 to 320°F and maximum corrosion occurred at surface temperatures within the range 215 - 240°F. The results confirm previous conclusions as to the influence of the acid dewpoint and of the SO<sub>2</sub> content of the gases on corrosion.

(1) Introduction

Work carried out on behalf of the Boiler Availability Committee\* has established that the corrosion occurring in air-heaters of power station boilers is generally due to the action of sulphuric acid condensing from the flue gases. Tests on full-scale installations using, among other instruments, air-cooled metal probes,<sup>1</sup> have provided quantitative data on the relation between corrosion and surface temperature and confirmed that there are several factors, especially dust loading in the gases,<sup>2</sup> which influence the degree of corrosion; whilst laboratory investigations, under controlled conditions, have shed more light on the mechanism by which corrosion occurs both in clean gases<sup>3</sup> and in the presence of carbon smokes.<sup>4</sup>

These earlier laboratory investigations carried out by Flint and Kear<sup>3,4</sup> employed a system in which a steel hemispherical surface, of limited area, was inserted into laboratory gases containing SO<sub>2</sub> for periods of up to one hour, and attention was focussed on the relative importance of dewpoint and metal temperatures. It was thought, however, that as the conditions in such experiments departed considerably from those in practice, interpretation of the results with respect to full-scale practice was correspondingly limited. The present series of tests have been carried out

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\*The Boiler Availability Committee is representative of the Water-Tube Boilermakers' Association, the British Electricity Authority, the Fuel Research Station and the British Coal Utilisation Research Association.