

DEPARTMENT OF SCIENTIFIC AND INDUSTRIAL RESEARCH AND FIRE OFFICES' COMMITTEE
JOINT FIRE RESEARCH ORGANIZATION

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A VISIT TO THE EAST MIDDLESEX SEWAGE PLANT, MONTAGUE ROAD, EDMONTON, N.9.

by

K. N. Palmer

1. Introduction

The premises of the East Middlesex Drainage Scheme, Edmonton, were visited on 21st December, 1953 by Messrs. Moss, Cook, and Osborn of Middlesex Fire Brigade, and the author. Mr. Sales, Manager of the plant, and Mr. Kelly (from the Togdon Purification Plant, Twickenham) were also present. A fire had occurred in a heap of sewage sludge and the question had arisen of whether the ignition was spontaneous.

2. Outbreak of fire and method of attack by Brigade

The fire had occurred in a heap of sewage sludge about 150 ft. in length, 40 ft. in width, and 10-25 ft. in height, as sketched in Figs. 1 and 2, the heap having been built on an old ash tip. Initially, the fire had burned through to the surface of the heap at the point A (Figs. 1 and 2) about 4 ft. above ground level, and was tackled, unsuccessfully, by sewage workers. The heap was not steaming or smoking on sides other than that in which the fire had broken through. The next day, 8th December, 1953, the Brigade was called in and they tunnelled into the heap at the point A and removed quantities of red hot material; after a cavern had been excavated for about 10 ft. into the heap, it appeared that the fire had branched. The roof of the cavern was then removed and a channel dug into the side of the heap, the material removed covering a greater area of ground than the original heap to a depth of about 15 ft. (Fig.1). The undisturbed part of the heap thus formed a "wall" about 10 ft. high overlooking the excavated material. On 10th December, after flooding with water, the fire was quiescent.

The Brigade attended again to deal with further smaller outbreaks in the heap, near the base of the "wall", on 11th, 14th, and 18th December.

Appearance of heap at visit

The material from which the heap was built had mostly been in position for several years, some even prior to 1939 and the consistency of the top 1-2 ft. was similar to that of soil, becoming more clay-like and darker brown at greater depths. Where the sludge had been dried by exposure to warmth it was of a light greyish colour and was hard and brittle. A small amount of sludge had been

January, 1954

File No. F.1040/77/2

Fire Research Station,
Boreham Wood,
Herts.

deposited this year, chiefly on the long side of the heap not affected by the fire.

At the time of the visit (21st December) steam was still issuing from several points along the base of the "wall" overlooking the excavated sludge and the smell of burning was also noticed at one point. The sludge was warm to the touch at these places. In addition, there was a crack several inches in width along the top surface of the heap (Fig.1), extending downwards into the heap, and steam was issuing at several points along this crack (Fig.1). The growth of grass and other vegetation was sparse on the top of the heap and negligible on the sides.

Previous history

The heap had been built upon an old ash tip which visibly contained large pieces of timber, the heap had always shown a tendency to crack and crumble slowly, an unusual feature in heaps of sewage sludge. During the last three years the smell of burning sludge had become offensive on three occasions but each time the fire was apparently only on the surface and had been dealt with easily.

A smaller sludge heap had been built on a nearby site within the last three years but there had been no signs of burning or of movement of this heap during the period.

There had been other fires on neighbouring sites in the past but these were surface fires, particularly grass fires, and in some cases were believed to have originated with children.

Origin of fire

At the time of the visit the fire was still burning slowly and appeared to be a typical "tip-heap" fire; there had been opportunities in the past for a burrowing fire to be started from surface fires. It would not then be unusual for a deep seated fire in the heap to continue for a very long period, occasionally breaking through to the surface and becoming more vigorous. Such a fire could also give rise to the long term cracking and other movement known to occur in this heap.

It is not considered necessary to invoke spontaneous ignition as the cause of the fire since, although the sludge is known to heat spontaneously up to about 80°C particularly if growing vegetation (tomato plants) is built into the heap, heating to ignition was not known to the sewage authorities and is probably very infrequent, if it occurs at all.

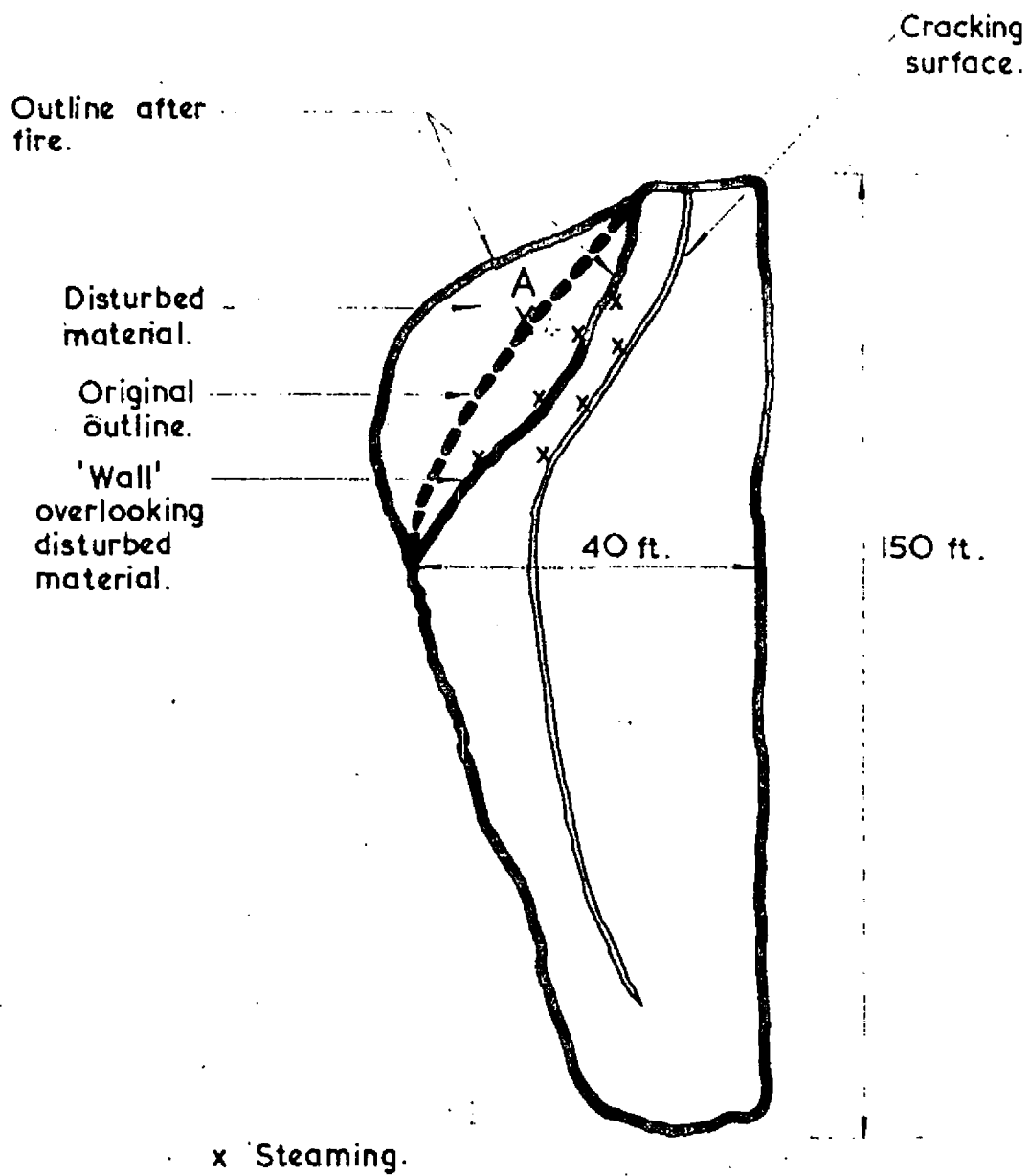


FIG. I. PLAN OF SLUDGE HEAP.

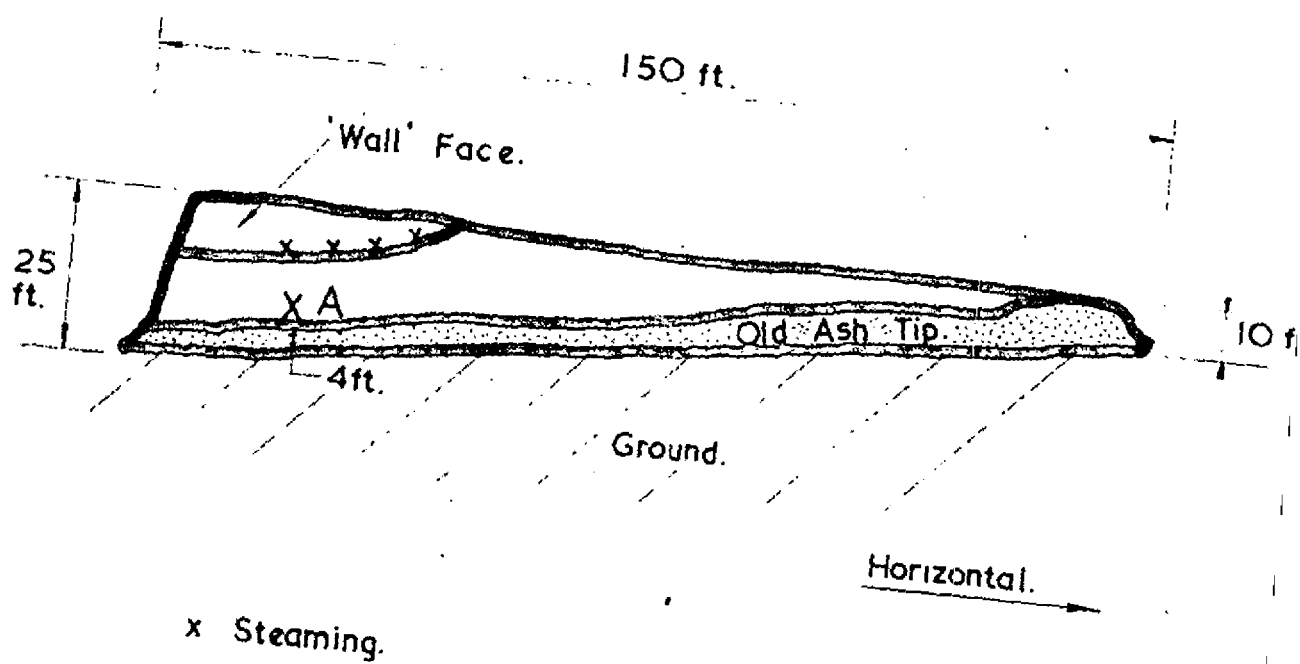


FIG. 2. SECTION OF SLUDGE HEAP