

2. Immerse the blocks after heating and creosoting under pressure in a bath of liquid pitch at  $110^{\circ}$ , the immersion being kept on for about 10 minutes; then apply superficial tarring of the laid pavement as described above.

The pitch to be used should be half-dry gas pitch including about 10% of anthracene oils.

The second method appears to be of a much superior efficacy. As long as the pavement will remain in good condition the protective layer will not be attacked. The addition of alkaline salt is yet not useless; for it permits of maintaining a certain improvement even in cases where, by consequence of the wear, the blocks should no longer be protected against the infiltration of an appreciable amount of water.

## COMMERCIAL UTILIZATION OF PEAT FOR POWER PURPOSES.\*

By H. V. Pegg, of Belfast.

The question of the utilization of peat fuel for power purposes has received a large amount of attention from engineers for many years past. Efforts in this direction have mostly taken the shape of some form of preparation of peat fuel in order primarily to get rid of the superabundant moisture in the fuel. Very large sums of money have been spent on peat-preparing machinery with generally very inadequate results, hence it has always appeared to the author that, in order to bring the utilization of peat to a commercial level, the first consideration would be the utilization of the peat as far as possible in the condition in which it leaves the boglands without any preliminary and expensive machine treatment.

The author had the opportunity about seven years ago of experimenting with air-dried hand-cut peat fired into a special form of gas-producer. With all gas-producers using bituminous fuel the main trouble is to get rid of the tarry by-product. In this instance the gas-producer was arranged to work intermittently, there being periods of "blowing" during which the fuel in the producer was urged to incandescence, and periods of gas-making during which the tarry by-products were passed through the incandescent fuel, where they were split up into gas. The chief difficulty experienced with this plant was the high thermal value of the gas generated, about 330 B.Th.U. Owing to the high and varying percentage of hydrogen in the gas, it proved unsuitable for use in the works gas-engine; and although the plant was running more or less continuously for ten days driving the whole works, very considerable trouble was experienced, not only in the engine, but also in the plant, owing to the varying moisture content of the peat, the producer plant being decidedly sensitive in regard to this latter point. From the experience then gained it appeared evident that it would be wiser to extract the tar from the gas, rather than to try to utilize the same by converting it into gas, and further, that the producer must be comparatively non-sensitive to the amount of moisture in the peat fuel. Some two years ago the author discussed the question of the utilization of air-dried peat fuel with Mr. Hamilton Robb, of Portadown, who, having large supplies of such fuel convenient to his factory at Potadown, was strongly of opinion that it should be possible to utilize such fuel in order to generate the power required in the factory. As the result of various tests run with an experimental plant at the works of Messrs. Crossley Brothers, Openshaw, a special plant was eventually manufactured by them under their designs and

patents and to the author's specification. This plant, which has been running since last September, has been so often dealt with in the daily and technical press that there is no need for the author to dwell upon the details of the plant, but he proposes to make a few remarks in regard to the difficulties experienced.

Air-dried peat is not a very convenient fuel to fire into the producer, and as it was uncertain whether it would be possible to burn the fuel direct in the form in which it came from the boglands, provision was originally made in the plant to deal with peat fuel prepared by being reduced in size to blocks of about 5 in. cube; but it was found possible to dispense with the preliminary treatment, and the construction of the plant was thereby considerably simplified.

As regards the general running of the plant, last October it was subjected to a test run of six hours' duration with a load of 250 brake horse-power, the peat consumption per brake-horse-power hour averaging 2.55 lb., the peat fuel containing 18.98 per cent. of water; this was with both producers running, although the load was considerably below the total capacity of the plant. When necessary it has been found that the above load can be safely carried with either producer working singly, and the plant has run under these conditions for several days.

It will be noted that the percentage of moisture in the fuel during the above test was unusually low. This was owing to the unusually dry summer of 1911. During November, and especially December, last the fuel fed to the plant was extremely wet, as the rainfall in those months was very heavy and the fuel supply was and is entirely exposed to the weather. The plant, however, worked just as well with sodden peat as it did with the drier peat, the only difference being the amount of fuel consumed. The amount of water in this "sodden peat" varied considerably from day to day, and the exact percentage was not arrived at; as near as could be estimated it was at least 70 per cent.

The separation of the tar from the gas was the chief difficulty to be overcome; it was found far better to rely on an ample watery-spray through which the gas passed rather than any form of a coke-scrubber, as the coke rapidly became clogged with tar. The main portion of the tar was thrown out into a tar-sump by a centrifugal tar-extractor; but unless the gases were subjected to a thorough washing and cooling by the water-spray above referred to, it was found that a certain proportion of tar got past the extractor, collected in the gas-mains, and finally found its way into the gas-engines. It was a matter of experiment as to the precise amount of water sprayed into the cooler which was necessary in order to ensure that the tar vapor should be sufficiently condensed before reaching the centrifugal extractor, so as to enable the extractor to effect the needful separation. As now arranged, the proportion of tar in the gas after passing the extractor is small, and the engine-valves do not want cleaning out more than once a week.

When first started, the plant generally, and especially the producers, required a thorough cleaning once a week; at the present date the plant can be run, if necessary, for three weeks without cleaning, though the weekly cleaning generally takes place as a matter of policy. This result has been obtained owing to the increased amount of washing-water used, which now amounts to about 7 gallons per brake horse-power per hour. The proportion of tar recovered is about 5 per cent. of the weight of fuel consumed, and during the initial stages of the running of the plant a certain amount of this tar was sold to tar-felt manufacturers at a price of 35s. per ton, but sales in this direction ceased owing to an, at present, ineradicable pyroligneous odor which persistently clings, not only to the tar itself, but to all the various oils distilled therefrom.

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