Track Account.

Rails		194	11	2		
Viaducts		61	3	11		
Sleepers		36	16	6		
					292	11	7

Wages Account.

Platelayers, drivers, stokers, etc..					1,231	4	11
					£2,423	8	6
Less cost of transfer to and from own trucks to L. & S.W. Railway, at Torrington Station		430	9	0			
Distributing and collecting traffic		234	18	0			
					665	7	0
Actual cost of working					£1,758	1	6

£1,758 1s. 6d. ÷ 35,326 tons = 11.97d. (say 1s.) per ton. One shilling per ton for 8 miles = 1½d. per ton-mile.

THE VALUE OF SAWMILL REFUSE AS FUEL IN GAS PRODUCERS.*

By Chas. E. Snypp.

I will endeavor to state briefly my experience in the firing of the following fuels in gas producers, namely, bituminous coal, anthracite, coke and coke braize, and sawmill refuse.

Our producer plant was installed for the purpose of burning Pittsburg bituminous coal, guaranteed to furnish gas of about 125 B.t.u. to the engines. As a matter of fact, we operated the plant continuously for about four years on various kinds of coal.

The producer we used was a pressure type Wood producer. The capacity of the producer plant was 840 h.p., consisting of a combination of three units each having a producer shell 8 ft. in diameter by 12 ft. high with steam jacketed top; one wet scrubber 5 ft. by 18 ft. high; one dry scrubber 8 ft. in diameter by 3 ft. high; one pressure fan; one gas holder, and one motor-driven mechanical tar extractor.

The coal was locked in through an air-tight hopper into each of the producer shells. When the workmen poked the fires, the gases under pressure from the blast escaped freely through the poke holes, causing great distress to the workmen. To overcome this difficulty we installed a fan between the dry scrubber and the tar extractor, intending to bring the producer shells under a slight vacuum. This relieved the men of the gases and yet retained our pressure in the holder, thus forcing the gases to our engines under pressure. I will state that this fan was too small to completely accomplish the purposes intended, though it did materially reduce the quantity of gas escaping from the poke holes, thus relieving the workmen.

After the producer gases are formed, they pass into the wet scrubber, which is an enclosed tower of slats, wherein the water passes in a downward direction and the gases pass upward. The gases are then conducted to a centrifugal mechanical tar extractor which removes most of the tar, and then to a dry scrubber, which is a shell about 8 ft. in diameter and packed with excelsior in layers. The gases then pass through an exhaust fan to the holder and thence to the engines.

The first coal that we burned was Pittsburg bituminous coal, but we found that while this fuel filled the requirements as far as the richness of the gas was concerned, our plant went out of commission at regular intervals in consequence of tar congestion. These intervals came closer and closer together the longer we operated the plant on this coal, on account of greater and greater accumulation of its peculiar tar. In fact, the tar was too heavy for the centrifugal tar extractor, and breakdowns of this machine were frequent. This led us to try other bituminous coals with the idea of reducing the tar nuisance.

After four years of continuous service of the producer plant on various bituminous coals we found that in spite of our selection the whole system of pipes and engines was becoming congested with tar. We also found that it was quite an expensive repair to remove this tar from the engine cylinder rings. In fact, many of the rings had to be cut from the grooves with a cold chisel. We found that a gas plant could not be run for more than five hours on gases from Pittsburg bituminous coals without taking out these tars, as the valves and piston rings would stick. Alabama coals did not do much better.

These Alabama coals were analyzed particularly for fixed carbon and volatile matter in order to select those with a high fixed carbon and a low volatile matter. They gave greater satisfaction because of the reduced quantity of tar, and at the same time furnished a gas that was just as rich as the Pittsburg bituminous, namely, about 125 B.t.u. The Alabama coal, however, introduced a trouble peculiar to itself, which finally forced us to abandon it. The first trouble was that the fuel came to hand of irregular quality, even from the same mine, particularly as to volatile matter and ash. The content of ash was especially unsatisfactory and very irregular, varying from 6½ to 11 per cent. Not only was the content of ash high, but it had the peculiar property of fusing in the producer or forming a solid clinker, which was almost impossible to penetrate with poke bars, and even after penetration with bars and sledges was not brittle enough to break in pieces of a size that could be readily removed from the producer itself. Besides this, the act of fusing cuts off the air from the fuel beds, producing a lean gas, or one low in B.t.u., finally putting that particular producer out of business.

We next resorted to the experiment of burning anthracite coal. Our experiment was limited to a few tons, but the conclusion reached was that we could not produce a gas high enough in heat value. The best condition did not yield much more than 100 B.t.u. in the gas. Besides, this fuel was to expensive.

The next experiment was to substitute coke and coke braize for anthracite. This furnished a fair quality of about 100 B.t.u. gas in the beginning, but we experienced great difficulty in the producers filling up with ash, and the ash fusing, thus causing cavities which could not be poked out. The quality of the gas sometimes fell as low as 80 B.t.u., thus putting the plant out of commission. When this happened we would have to cool down and sledge the clinkers. I noticed that when the gas became lean we could raise the heat value of the gas by feeding the producer with barrel staves, which would keep us running.

During this interval numerous improvements on the producer plant were made, as follows:

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