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Disposal of Refuse In Towns and Cities

Burning or Burying of Garbage and Other Waste the Only Sanitary Means

Refuse disposal is usually a serious problem for the small city or town to solve. In such cases public incinerators are not always economical and the ordinary dump needs careful regulation to prevent it becoming a nuisance.

Burning or burying is the most desirable method of disposing of ashes, rubbish, manure and garbage in cities. Of these, burning is the most sanitary, and no other means should be used in cities having a population of, say, 20,000, or more. Refuse incinerators are of two main types (1) the coal fired or, "low temperature," and (2) the high temperature. The latter is designed to handle mixed garbage without the use of coal. Very few of these have as yet been installed, and their advantages have not been entirely proven. For the coal-fired incinerator a long-flaming coal of good quality is essential. This, of course, makes the cost of operation all but prohibitive for most small cities and towns.

In such cases, other means of refuse disposal must be obtained. To simply dump garbage in an unrestricted manner on some vacant lot should be classed as a criminal offence, and punished accordingly. The practice of burying refuse, where it is carefully carried out, is usually found to be cheap and at the same time effective.

The principle upon which refuse burial rests, especially as applied to garbage, is, primarily, a bacteriological one. The action of the soil bacteria is to mineralize the organic matter in the refuse. In order to prevent the occurrence of putrefactive or other objectionable odours the mineralizing process must be carried out in the presence of sufficient oxygen or air. To secure these conditions the following points should be observed: (1) The garbage should not be buried too deep, nor should it be spread in too thick a layer on the ground. (2) The ground used should be sufficiently porous and well drained to admit the air readily. (3) The garbage should be mixed with enough other refuse to prevent overloading the soil.

These conditions are obtained in different ways. In some cities the refuse is spread on the ground and then ploughed under. Another method is that of digging a trench, covering each day's collection of refuse with the soil, removed for the next day's supply. In any case, refuse that can be burned should be so treated and garbage and other organic waste can be more effectively handled by mixing it with other waste such as ashes, street sweepings, etc. It is claimed that 1.5 acres are necessary to handle each daily ton of garbage permanently. The soil can be re-used at the end of two years.

Lignite for Power Purposes

Possible Advantages of Central Power Plants at Lignite Fields —Overcoming Loss Due to Fuel Transportation

Lignite coal disintegrates rapidly and does not possess a very high calorific value. Consequently, it is seldom economically possible to ship it for long distances, to be used for developing power. At the same time, there are excellent reasons for believing that central power plants, situated at the lignite areas in different parts of Western Canada, could economically generate and transmit power to towns and cities within a considerable radius of the fields.

The following table gives a comparison of fixed charges involved in power transmission and fixed charges on fuel transportation. The information has been largely obtained from a paper by Mr. J. V. Hunter given before the American Institute of Electrical Engineers in December, 1911. The figures relative to freight rates on coal from the mines to the point of consumption have been calculated from Canadian freight tariffs. In Western Canada, the average freight rate on coal per ton-mile for a 100-mile haul is a trifle over 15 mills.

It will be noted from the table, that the annual loss by transportation of fuel from the mines to the point of consumption (100 miles) varies from $61,945 for a plant of 5000 k.w. capacity, to $346,674 for one of 20,000 k. w. capacity. The conditions assumed in this table, however, are for a constant power load for 24 hours a day, and the comparison would not be as favourable if the load was only on for a portion of the day.

In any case, the figures are sufficiently startling to warrant an investigation being made as to the possibilities of central power plants at the lignite fields in Saskatchewan as compared with the present method of hauling bituminous coal long distances by rail to the markets in central Alberta and Saskatchewan.

COMPARISON OF FIXED CHARGES INVOLVED IN POWER TRANSMISSION AND FREIGHT CHARGES OF FUEL TRANSPORTATION.

POWER STATION AT MINES. DISTANCE, 100 MILES FROM POINT OF CONSUMPTION. FREIGHT, $0.015 PER TON MILE. COAL, 4.0 LBS. PER KW. HR.

Details of Construction and Losses	Central Station capacity 5,000 kw.	10,000 kw.	20,000 kw.
Right of way; Cost per 100 miles 50 feet wide.	$60,000 at 5% $ 3,000	$60,000 at 5% $3,000	$60,000 at 5% $ 3,000
Steel tower const'n. Cost per 100 miles; Twin circuit towers not including copper	$332,200 at 9% $29,898	$322,200 at 9% $29,898	$322,200 at 9% $29,898
Conductor; Cost for most economic line, Copper at 14c. lb.	$70,000 at 6% $4,200	$140,000 at 6% $8,400	$280,000 at 6% $16,800
Kw.hr. loss on line; Cost of $0.003 per kw-hr.	$4,857	$9,714	$19,428
Transformers; Equal capacity at each end of line to carry load; Cost $15.00 per kw.	$150,000 at 15% $22,500	$300,000 at 15% $45,000	$600,000 at 15% $90,000
Total of fixed charges and losses	$64,455	$95,012	$159,126
Freight charges, one year's coal supply..........	$126,450	$252,900	$505,800
Loss by transportation of fuel....	$61,945	$156,788	$346,674

W. J. D.

About the Pulmotor

This little device, which is so simple in operation, but is actually the result of years of research, has given results that are almost unbelievable in reviving persons apparently dead. There are many places where the necessity for such a device is felt much more often than at the ordinary coal mine. Many men have died in chemical works, electrical plants, steel works, and gas works, who could have been revived by timely use of this invention. The Commission of Conservation could not go far wrong in recommending the provision of a "pulmotor" for every city hospital, every large fire brigade, and in connection with all works where men run the risk of suffocation by gases or death from electrical shock.—*F. W. Gray, in Canadian Mining Journal.*

Causes of Failures in Power Projects

Insufficient Data Frequently Leads to Wrong Conclusions—Mistakes of Other Countries Should Be Avoided

That Canada has had so few failures in water-power undertakings is explained in large part by the fact that only the best power sites have, as yet, been taken up. The rapid industrial development throughout the country, combined with the steady increase in the use of coal for power purposes, is creating an ever-growing demand for electrical energy. As a consequence, the next few years will undoubtedly see many inferior power propositions developed. This work, unless carefully handled, is more likely to meet with failure, than were the projects undertaken in the past. The causes leading to such failure in other countries should, therefore, be of more than ordinary interest.

Assuming that a project has a sound and sufficient financial backing and that the promoter has not taken a too optimistic view of the expected market, the remaining possible causes of failure may be classed as purely engineering. Structural failure, although most disastrous when it does occur, does not happen very frequently and may almost be said to be accidental or uncontrollable. There remains two great causes of failure, first, where the cost of development has been under-estimated and, second, where the power available has been over-estimated.

A well-known engineer, now at the head of one of the largest power organizations in the United States was given the following rule by one of his bankers:

"We will not consider a water-power project unless, after doubling the cost, cutting the available power in two, and reducing the market price by 40 per cent., it will still show interest on the bonds necessary to issue."

Over-estimating the power available almost invariably comes from the lack of sufficient data on the flow of the stream considered; in the absence of actual gaugings of a river, it is almost impossible to estimate accurately the low-water flow, especially that of a small stream. In the absence of continuous gaugings, a fairly reliable

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