

Customers' installations should be subject to supervision. Where flat rates are in use, rigid regulations should be enforced, underground construction should be of best quality to reduce maintenance costs and minimize heat losses. But it must be kept in mind that investment charges on expensive underground construction form a serious item in the cost of district heat supply, and construction costs must not become so heavy that the charges more than offset the resulting operating economies. Where meters are used, a thorough system of inspection and tests is necessary to prevent serious losses of revenue. Above all, adequate records are essential for intelligent and economical operation.

Local conditions have much to do with the success or failure of heating systems; and plants are operated in many places where local conditions do not warrant the investment. This is partly due to the idea that any heating revenue is net profit, and to considerations of policy, such as necessity for occupying the territory to prevent undesirable competition and the ability to offer heating service in connection with electric service. Among the points to be considered in local conditions are location of steam plant, density of available business, probable growth of district, obstructions to underground construction, probable loss of electric-plant capacity and efficiency due to back pressure, length and character of heating season, probable coördination of heating load and electric loads and relative costs of steam coal and domestic coal. These points apply to exhaust heating. Where live-steam heating is contemplated, other considerations enter and the chances of loss become much greater.

Plants depending principally on electrical business may be operating at a loss because they carry undesirable business, such as restaurants, etc., which require summer service. Low rates may be intentionally established to facilitate taking over private plants, with combined heating and electrical load, but this does not seem warranted except where the value of the service to the consumer will not permit higher rates and where the net result is an advantage to the entire electric business.

DEPRECIATION AND SINKING FUNDS.*

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I have decided to continue the discussion on depreciation and sinking funds as introduced by George Macoun in his paper, which was read before the Australasian Tramway Officers' Association in Sydney on October 9th, 1908.

Mr. Macoun's object was evidently to open up ground for discussion with a view of promoting a better understanding of the subject generally. He quotes the statement of James Dalrymple (manager of the Glasgow Tramways), who, at the Municipal Tramways' Association at Leeds in September, 1906, said: "I have always looked upon municipal corporations very much as I look upon an individual. If I, as an individual, borrow £1,000 to start business, I must pay that £1,000 back before I am a free man," and concludes that he approves of the remark "that a sinking fund has nothing whatever to do with a depreciation fund." Undoubtedly Mr. Dalrymple is right in the latter contention, but his argument that because an individual should pay off his loans the corporation should do the same is not necessarily logical, nor is it incumbent upon the individual to repay his loans, unless, perhaps, with the borrowed capital.

* Abstract of paper read at third conference of the Australasian Tramway Officers' Association.

Mr. Dalrymple's ideal of a "free man" and "free corporation" is largely a matter of sentiment and will be dealt with in connection with municipal debt and credit later on. Mr. Macoun also says that at the same meeting G. W. Holford, general manager of the Salford Tramways, stated the view that rolling stock, buildings and overhead equipment could be maintained out of revenue, but that a reserve for renewals of permanent way is absolutely necessary. I do not think it advisable to introduce to such an extent different principles in the treatment of different parts of the undertaking, as this destroys to some extent the value of the comparative statements of operating costs. It is clearer and better to keep operating expenses, including ordinary maintenance, distinct from renewals, and separate accounts should be kept for the renewal of each class of plant and machinery, etc., but permanent buildings of an incalculable length of life may be maintained out of revenue.

The rates at which the various tramway undertakings provide for their depreciation reserve are as variable as they are interesting. Especially interesting is the reserve of the Glasgow Tramways, which to-day stands at about 50 per cent. of the capital cost. In the opinion of Mr. Dalrymple, therefore, the Glasgow Tramways have depreciated 50 per cent., notwithstanding their high standard of maintenance and the large sums already expended in renewals. This is referred to as being a very gratifying financial position for the Glasgow corporation; undoubtedly, nevertheless, the reserve may be unwarranted, and I have very grave doubts as to whether the Glasgow corporation values its assets at only half of the capital cost.

Obsolescence.—As Mr. Macoun has pointed out, obsolescence is a quantity as incalculable as an earthquake, and it may happen that in the reserve to cover obsolescence there may be a provision greatly in excess of the requirements of the more modern parts. Whichever way it may occur, in all probability it may only be partial in an electrical tramway system for a great number of years, and a large residual value may remain; but if it is a question of life or death, which we cannot cover by insurance, we must take the risk.

As a matter of course the renewal fund is raised from year to year, and renewals are made during the same periods, so improvements are introduced and obsolescence gradually gives place to modern inventions, and the great "bogey" obsolescence, which has hitherto been more imaginary than real, is no more to be provided for, other than in the renewal fund, than an earthquake.

Depreciation is not provided for generally by state governments, but they pay for their renewals, when convenient, out of the then current year's revenue. Such renewals sometimes include a proportion of capital expenditure left unrecorded as such. This is a system to be deprecated. Ultimately the undertaking may thereby show a greater percentage of revenue to the capital cost recorded in the books, but a government which treats its accounts in prosperous seasons in this manner shows fictitious results and deludes itself and the public, believing that its railways and tramways are subsequently paying, whereas, had the capital expenditure out of revenue been capitalized instead of written off as expended, a loss might have been manifest later. Revenue expenditure is thus imposed upon in prosperous seasons, and the so-called capital cost is kept far below the actual capital outlay.

This system is also to be deprecated because in poor seasons the permanent way and rolling stock become starved, and depreciation then sets in at an increased ratio and there is no provision to meet it. Generally speaking,