

head may be calculated without the labor attendant upon the use of the usual formulas for flow of water in pipes.

8. There is an advantage in a large pipe by reason of the large discharge for a given head and also in the smaller opportunity for water hammer. In an installation having a high head available (as in some gravity lines) the pipe may well be smaller than in the common installation, provided the arrangement of the valve closure guards against water hammer and proper relief valves are used.

9. The water hammer pressure generated in a pipe line when a valve is closed suddenly and no relief valve is used, for the sizes and thicknesses of pipe used in ordinary water service installations, will be, in lbs. per sq. in., about 54 times the velocity of water in the pipe in ft. per sec. The term "sudden closure" is here taken to mean that the time consumed in that part of the valve movement which gives relatively high valve resistance is less than the time required for the pressure impulse to travel from the valve through the pipe line to tank and back at a speed of about 4,000 ft. per sec. This effective portion for all but two of the water columns tested was the last 15 per cent. of the valve movement.

10. For a slow closure the resistance through the valve opening is the chief force in stopping the mass of water.

11. In all but one of the water columns tested the resistance through the valve opening was not markedly larger than that at full opening until the valve had attained at least 85 per cent. of its closure. Since during the first 85 per cent. of the valve movement little work is done in stopping the water and since during this portion of the valve movement water hammer will not be developed even with rapid closing, it follows that it is immaterial how quickly this first 85 per cent. of closure is made. The time thus saved may well be used in lengthening the time for the remaining 15 per cent. of closure. The time pressure diagram and the valve movement pressure diagram of one of the newer forms of water column illustrate the hydraulic advantages which may be gained in this way.

12. From general considerations it is reasonable to expect that 8-in. and 12-in. water columns will have losses approximately the same as those found in the 10-in water columns at the same velocity of flow.

CANADIAN ASSOCIATION OF STATIONARY ENGINEERS.

The convention of the above named society was held in Stratford, Ont., last week, and was a most successful gathering. At the close of the convention the following officers were elected for the ensuing year:—

President, W. Norris, Chatham; Vice-President, J. A. Robertson, Stratford; Secretary, W. A. Crockett, Hamilton; Treasurer, A. M. Wickens, Toronto; Conductor, H. R. Clarke, Hamilton; Doorkeeper, S. E. Cqsford, London.

The Exhibitors Association of the C.A.S.E. also elected officers as follows:—President, Earl F. Hetherington, Goldie & McCulloch, Galt; Vice-Presidents, J. E. Fiddes, James Morrison Brass Manufacturing Company, Toronto; John B. Goff, Dart Union Company, Toronto; Secretary, Gordon E. Keith, Toronto; Assistant Secretary, J. N. Charles, Canadian Fairbanks Company, Toronto; Treasurer, H. V. Tirrell, Toronto; Superintendent of Exhibits, W. R. Stavert, Jenkins Bros., Montreal; Chairman Entertainment Committee, Peter Bain, Toronto.

Belleville was chosen as the next place of meeting.

DEPRECIATION AS RELATED TO ELECTRICAL PROPERTIES.*

Henry Floy.

The courts repeatedly use "fair value" as the only one which should be recognized, and it is this value that the engineer must bear in mind when estimating depreciation. Fair value includes something in addition to physical values, in which the engineer is primarily interested.

There is much evidently sincere but nevertheless mistaken opposition to the application of any principle of depreciation in determining the value of going properties; and yet a consideration of what depreciation—if any—has taken place in the physical property of every corporation must be had, in order to obtain a safe—though it may be only approximate—indication as to proper or improper capitalization.

Application of Terms.

Depreciation.—Webster defines "depreciation" as the "act or state of lessening the worth of," and in this sense it will be used by the writer regardless of the source or method of worth reduction, or by what means it may or may not be removed.

Physical Value.—This includes primarily "those things which are visible and tangible, capable of being inventoried"; but, secondarily, certain non-physical charges "which are an inseparable part of the cost of construction but which do not appear in the inventory of the completed property." These secondary values are expenditures for such items as engineers' and architects' fees, administration expenses chargeable to construction and provision for various incidentals and contingencies, incomplete inventories, unforeseen requirements, etc.

Development Expenses, Intangible or Overhead Values.—Development expenses generally cover most or all of the following expenditures:

1. Legal and other expenses of preliminary promotion, incorporation and organization, procuring consents of property owners, condemnation proceedings, obtaining franchises, consents and certificates from public service commissions and other public bodies, title examinations and insurance.
2. Technical expenses in connection with preliminary work, surveys, expert estimates, etc.
3. Interest on capital and bond issues, wages of superintendence and administration not chargeable to construction ordinarily necessary in connection with putting a property in going order; and also sometimes the deficiency in operating expenses and taxes until the property is put on a paying basis.
4. Taxes which must be paid until the property is completely a "going concern."
5. Discounts on securities, brokerage or other customary and necessary expenditures in connection with financing such an undertaking and marketing securities.
6. Reasonable promotion profit, possibly also compensation for risk of capital estimated at 5 per cent. to 10 per cent. of the cash investment.

Development expenses are not ordinarily depreciated in the same way as the physical property, though some authorities have indicated that such procedure is proper. Development expenses may well be amortized. The rate of amortization might well be based on the life of the securities, whereas the depreciation of the physical property would have to be based on its rate of deterioration through life,

* Abstract of paper read at the twenty-eighth annual convention of the American Institute of Electrical Engineers.