

**ENGINEERING  
PRELIMINARIES FOR  
AN INTERURBAN  
ELECTRIC RAILWAY**

Published @ 2017 Trieste Publishing Pty Ltd

ISBN 9780649353880

Engineering Preliminaries for an Interurban Electric Railway by Ernest Gonzenbach

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ERNEST GONZENBACH.

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NEW YORK:  
McGRAW PUBLISHING COMPANY.  
1903.



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## ENGINEERING PRELIMINARIES FOR AN INTERURBAN ELECTRIC RAILWAY.

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### INTRODUCTORY.

In view of the present interest in interurban railway development and engineering the writer submits, as the result of an invitation from the *STREET RAILWAY JOURNAL*, the plans and recommendations embodied in a report on a proposed railway in the Middle West which serves as a good example of many roads now on paper, and which may soon assume tangible form. This article is in no way to be construed as an attempt to generalize and instruct others in the art of railway construction, but is intended to show the way in which certain conditions were to be met in a certain case, together with the reasons which led up to the recommendations and plans therein submitted.

At the time the writer was invited by the promoters to examine and report on the proposed road and its equipment, there had been submitted by one of the large manufacturing companies a proposition to equip the road for high-speed service with four large motors of 125-hp per car, 80-lb. track rail, and 100-lb. third rail, and correspondingly heavy sub-stations, distributing system and power house. The promoters had, furthermore, taken several trips to examine a

lately opened high-speed railway with an equipment similar to the one they proposed to install, and there seemed to be a fairly unanimous opinion that the new road should follow the same general lines. As I shall again refer to this road we may designate it for our purpose as the A, B & C Railway. The writer's recommendations differed in many respects from those proposed by the manufacturing company, mostly, however, in the fact that smaller motors and smaller sub-stations and power house equipments were recommended throughout for the reason that, as will be shown below, as good or better service could be given with these smaller equipments than with the larger ones, by a very simple departure from the accepted form of time-table in use on most railways. As a result the proposed total investment per mile of track is very much lower, and the operating costs per car-mile will at the same time be reduced.

It is far from the writer's intention to insinuate any tendency on the part of the manufacturing companies to recommend and sell heavier equipments than are necessary. Numerous instances are on record where selling companies proposed less expensive equipments than those demanded by the purchaser, and their reputations in this respect are sufficient evidence to the contrary.

The present tendency towards extremely heavy equipments for cross-country roads is an outgrowth of elevated and similar practice, where heavy equipments and high acceleration are not only justified but absolutely necessary. The earnings of elevated roads which warrant these heavy investments are never approached, however, by the strictly interurban road, and there are several of the latter now in

operation which stagger under the financial burden of the elevated equipment and country road income.

The preliminary step in any electric railway undertaking, therefore, is first to make an accurate and conservative estimate of the income which can be derived from all possible sources of revenue, including passenger and freight receipts, amusement resorts, mail and express and electric lighting and power. This estimate should not be a mere guess, but can be very accurately arrived at by comparison with what other roads are doing. One must carefully choose roads, however, which physically and financially are nearly parallel cases to the proposed road, operate in much the same class of country, industrially considered, and known to be efficiently equipped and handled. The examples from which to judge need not be numerous if they are carefully chosen. The plans for our example, which we will call the D, E & F Railway, will be developed from the preliminary estimate of income and equipment to the operating details.

#### ESTIMATED INCOME.

A map of the proposed railway, Fig. 1, shows that it would serve a number of small towns, and that it parallels a trunk line railway which gives a very fine, though infrequent, service. The surrounding country is one of the rich farming districts of the West, and F is a large industrial town. There is also considerable industrial activity in most of the towns to the west of F as far as E. From E to D is a farming and dairy country, with few or no industries. The first step now is to get an accurate record of the population. For this pur-