

ABRIDGMENT

Newman, Donald G. "Economic Analysis Applied to Railway Grade Crossing Improvements." Presented at the 45th Annual Meeting of the Highway Research Board, Washington, D. C., January 17-21, 1966. Manuscript copy contains 31 pp. of text, 32 references, and 1 appendix. Appendix: "Computer Flow Chart for Economic Analysis Model," 6 pages.

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Auto-train accidents are a continuing problem. Although various types of mechanical protection equipment can significantly reduce grade-crossing accidents, the funds to buy and maintain these devices at crossings are necessarily limited. The problem is to design a method for selecting the crossings to be improved and the types of improvements to be made so that benefits are maximized.

The premise here is that engineering-economic analysis is the best method by which the limited resources available for crossing protection can be allocated in an economically efficient manner. To prepare an economic analysis of this problem initial and continuing costs of the various kinds of improvements are required. Also, the resulting benefits must be identified and defined in comparable units.

617 crossings on the California State Highway System were studied for the period 1946 through 1963. By multiple-linear-regression analysis, hazard rating formulas were developed for five crossing protection devices. With these formulas an economic analysis is prepared to determine if improvements are justified for an individual crossing. The model is then extended, by use of a digital computer, to select economically attractive projects from a large number of grade crossings and to rank the projects in their order of desirability.

The use of a computer to analyze grade-crossing protection is an important step forward in two respects. First, the computer makes an analytical solution possible, since only in this manner can the vast number of calculations be performed. Second, the analytical analysis is an attempt to satisfy the proper economic goals.

A detailed analysis was made of highway-rail intersection protection in the state highway system of California. The results of this analysis of 407 crossings indicate clearly that present policies should be re-examined. There seems to be little economic justification for installing a sizable number of the more expensive protective devices at crossings on the system; currently, such installation would be justified at only about one crossing in 25.