Use of Sufficiency Ratings in Long-Range Planning

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THE DEVELOPMENT of a long-range program using sufficiency ratings is a relatively simple process, assuming that cost estimates for construction projects are available as they must be for any long range programming.

The first step is the establishment of a sufficiency rating cut-off point, the point below which road sections are inadequate for proper service to motor transportation. For example, if for a particular road system it is determined that ratings of 65 on the sufficiency rating scale represent the dividing point between satisfactory and unsatisfactory road sections, this is the cut-off point, 65. It represents the minimum acceptable level for any part of the road system. On completion of the program, the entire road system will have ratings higher than the cut-off point. Establishing the cut-off point is similar in the sufficiency rating approach to the establishment of tolerable standards in the long range planning that has been done in a good many states.

With the cut-off point established, all road sections having sufficiency ratings below it are placed in the category of urgent needs. Estimates of cost for projects to provide the necessary improvements are accumulated and represent the total urgent needs. This is the basic part of the long range program - the present deficiency in the road system.

If the deficiencies were to be taken care of on the instant, the urgent needs total would represent all of the program. However, in scheduling the correction of deficiencies over a period of ten years, as is now generally recommended, it must be recognized that additional deficiencies on other parts of the system will develop during the program period. Further, there will be structural deteriorations and other requirements for construction work presently not foreseeable. Based on past experience and anticipated additional traffic volumes, it is possible to estimate what allowance must be made for these items and to add it to the present urgent needs and come up with a total cost estimate.

This represents the construction part of the long range program. To it must be added requirements for maintenance and administration to obtain the total cost for preserving and developing the highway system.

ALTERNATIVE PROGRAMS

With the sufficiency-rating procedure it is possible, very simply, to set up alternate programs based on more than one level of tolerability. And the results can be readily visualized both as they affect specific road sections as well as the total highway system. This is illustrated in Figures 1 and 2.

Figure 1 is a chart which shows the sufficiency ratings mile by mile along a 23-mi. section of US 29 in Virginia[1]. Two cut-off points have been superimposed on this chart to indicate the results of alternative levels of tolerability. Additional levels could, of course, be similarly reflected. In each case the effect could be readily visualized in relation to specific sections of the highway. In this case, for example, Alternate 2 would place the section beginning at Mile 6 in the category of urgent needs whereas Alternate 1 would not. And that would be the only difference between the two alternates as applied to this section of highway.

Figure 2 is a chart showing an entire road system[2] arrayed according to sufficiency rating of individual road sections. The result of applying two cut-off points

[1] From Automotive Safety Foundation's Interim Engineering Report, "Highway Needs in the Emergency."

[2] Based on Louisiana Sufficiency Rating Report for Federal-Aid Primary System - 1950.

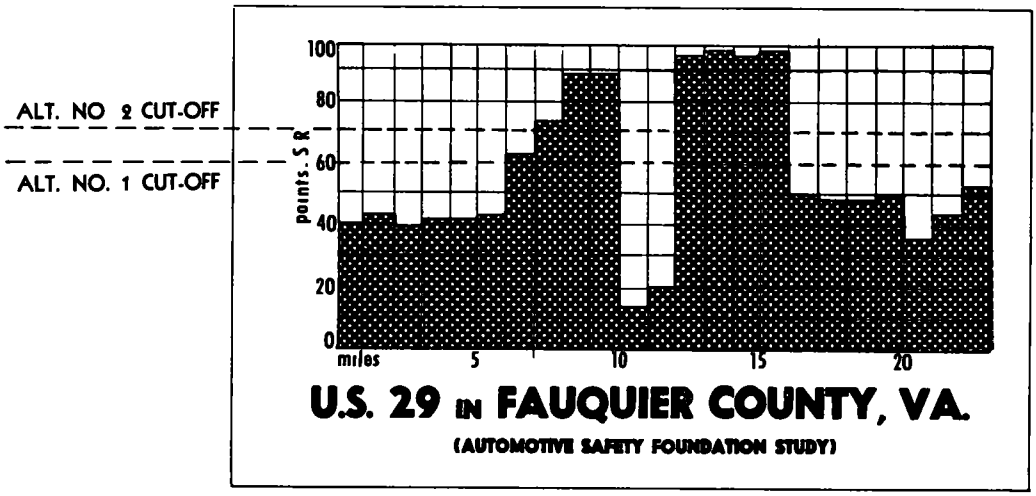

Figure 1. Alternative Programs Include Sections Below Cut-off Level.

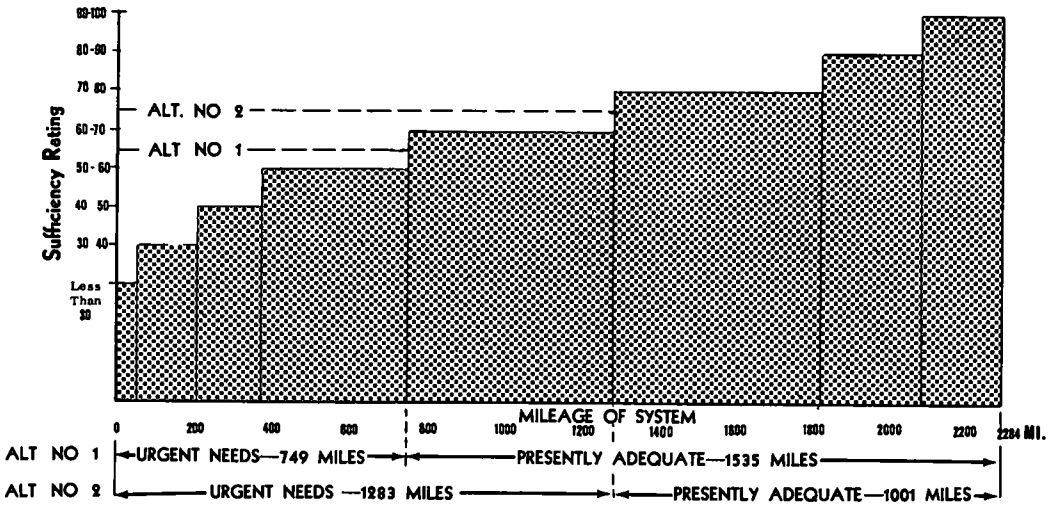

Figure 2. Alternative Programs Include Sections Below Cut-off Level.

to obtain alternative programs is indicated, using for illustrative purposes, the same two levels shown on Figure 1. Under Alternate 1, 749 mi. of the system, or 33 percent, are classified as urgent needs. Under Alternate 2, there are 1,283 miles, or 56 percent.

The magnitude of the urgent needs mileage and the cost to meet these needs are not directly proportional to the magnitude of the alternative long range programs because of the other elements that go into the program. They do indicate the current deficiencies on alternative levels and provide the basis from which the alternate long range programs can be developed.

CONTINUING REVIEW OF PROGRAM

Use of sufficiency ratings by state highway engineers carries with it the maintaining of the ratings on a current basis. There is thus provided the means for continuing review of the long range program when it is formulated on the sufficiency ratings.

The trend in the composite sufficiency rating for the entire system will indicate the degree to which the adequacy of the system is being raised. The mileage of the system each year below critical sufficiency-rating values will serve to check the effectiveness of the long range program. This is illustrated by the data presented in the annual reports of the Arizona Highway Department. In the 1951 report for the state's federal-aid primary system it showed:

As of	----Mileage at or below----	
Jan. 1	50 points	60 points
1947	282	650
1948	264	564
1949	195	601
1950	161	538
1951	211	479

Illustrative of the use of such information it will be assumed that on January 1, 1947 a 10-year program was established based on a cut-off point of 60 points[3]. In 10 years, existing urgent needs below 60 (650 mi.)would be taken care of and additional miles falling below 60, because of structural and traffic changes during the program period, would likewise be improved as a part of the program. The net mileage in service below 60 points as of January 1 each year, after taking account of new construction, increased traffic, etc., should be reduced at a fairly regular rate to 0 as of January 1, 1957. This is illustrated in Figure 3, which is self-explanatory.

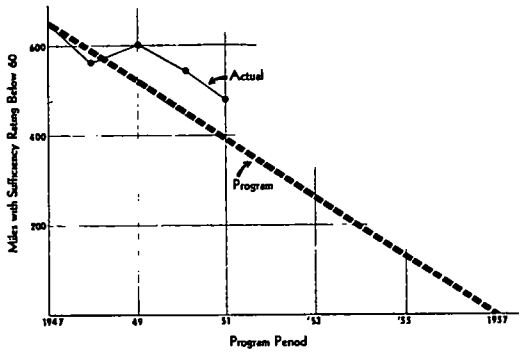

Figure 3. Measuring Program Progress.

The annual review associated with the sufficiency rating procedure not only provides a review of progress but encourages reevaluation of the program as required to reflect changes in the price level. The adequacy of existing financing is thereby subject to continuous review, also.

PUBLIC UNDERSTANDING

A long range program established on the basis of the sufficiency ratings and kept up to date from year to year will encourage public understanding of and confidence in the programming process. In many parts of the country today highway requirements are not being properly met because the programming procedures are not clearly defined and readily understood.

Highway engineers are quite aware of the urgency of the needs on the main highways. So, also, are those highway users who are well informed and conscious of the effect of highway deficiencies on motor transportation. But all too frequently legislative provisions for highway finance do not give sufficient emphasis to the main highways. Obviously there is a need for a programming process applied impartially

[3] This is used for illustrative purposes only. Review of road sections at various sufficiency levels in relation to proper service of motor transportation should be basis of deciding appropriate cut-off point on any system.

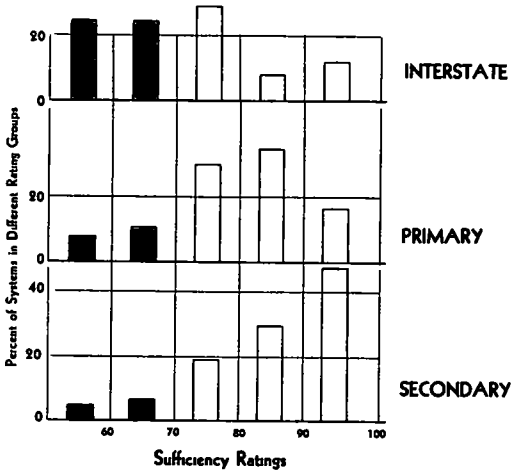

Figure 4. Colorado Rural F.A. Systems-1951

to all systems which will assure appropriate attention to all road systems.

Figure 4 illustrates the way in which the sufficiency rating point up the much greater urgency of needs on the Interstate System in Colorado as compared with other federal-aid primary routes and secondary routes[4]. In the Colorado sufficiency rating report, it is indicated that a rating of 70 is the point below which road sections are intolerable and should be programmed as immediate needs. The shaded bars on the chart represent such sections. About 50 percent of the interstate system falls in this category. This compares with 18 percent for other federal-aid primary routes and 12 percent for secondary routes.

In summary, sufficiency ratings provide a sound, yet flexible, basis for a continuing long range highway plan under procedures which are readily understandable by nontechnical individuals and groups whose support is essential to realization of the program.

[4] From Colorado Highway Sufficiency Rating Study - 1951.