

Charts for Highway Needs Studies

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Charts for highway needs studies must perform special functions, as they are not aimed at technical groups but at citizens who are not familiar with chart structures. Because of this non-technical aspect, charts for the studies should have proper use of color, attractive presentation, legibility, simplicity, and ease of reproduction.

This paper discusses the use of each of these items, using illustrations to point out the good and bad features of charts published in various highway needs studies.

Improvement during the past ten years has been quite noticeable. Charts in the most recent reports are far clearer and better than in the earlier reports. When charts in highway needs studies can be followed readily by the general public and those who must support the findings, it is easier to gain general acceptance of the report.

● **CHARTS** for highway needs studies are in a different category from most charts. Long-range highway studies are developed to show legislators, other public officials, and the general public the highway problem in a particular state. Therefore, the charts must be aimed at these individuals, who frequently do not have the technical background to grasp involved statistical or engineering charts.

Many textbooks and articles have been written concerning the mechanics of chart preparation; therefore, this subject will not be covered in this paper. Rather, it will discuss the special requirements of charts for needs studies, both for printed reports and for use with talks to various groups.

Because of the non-technical nature of the audience, all charts for highway needs studies should develop only one or two points. They should be simple, and presented so as to catch the eye and get their messages across quickly and easily.

To determine the effectiveness of the charts prepared so far, all available needs studies were reviewed to determine the type of chart used and whether or not each chart was satisfactory for its intended purpose. There were many different kinds, ranging from the simple to the involved. Most of the charts were effective presentations, but the improvement over the past 10 years was very noticeable. Charts in the most recent reports are far clearer and better than those of earlier reports.

Seven charts were selected for review to illustrate the good and bad features. Most of the figures show some printed matter on the page where the charts appear. This has been done to indicate that all charts were taken from printed reports. In this connection, the illustrations have lost some of their effectiveness because they are photographs taken of printed cuts.

Before discussing the charts individually, it should be emphasized that, obviously, there is no one type of chart that can be used universally. Each must be developed to bring out the salient point of a particular argument. There are some facets however that should be common to all charts. These are proper use of color, attractive presentation, legibility, simplicity, and ease of reproduction.

Use of color seems to be almost universal now. It can enhance the effectiveness of most charts. However, colors should be chosen with care, so there will still be contrast if the chart is reproduced in black and white. Newspapers may want to reproduce charts and their material is normally printed without color.

An attractive presentation is essential to good response. The chart must catch the eye with its message almost leaping out at the reader. The chart itself should require little or no study for the point to be understood.

Legibility ties into presentation. A chart that can be readily understood must have a good presentation. Attractiveness results from proper use of color or other dressing. Legibility is hard to define but is illustrated by the figures accompanying this article.

Simplicity primarily means developing only one major point in each chart with one, or at most, two subsidiary points. Everyone has seen charts that are so involved as to need several pages of explanation. This type is not suited for highway needs studies. Straight lines, bars, or easily recognized geometric figures or symbols are the types that should generally be used.

The charts should be drawn and color used so that engraving cuts can be made easily. When they can be reproduced readily without retouching the cost will be kept to a minimum. This is particularly important in highway needs studies as numerous charts will be required to bring out the necessary statistical information.

With the exception of Figure 1, all of the charts discussed in this paper used color in various ways. It can be seen that all lend themselves to reproduction in black and white. Figure 1 is taken from an early report. The idea behind this chart was excellent. The photographs show graphically the difference between a congested street

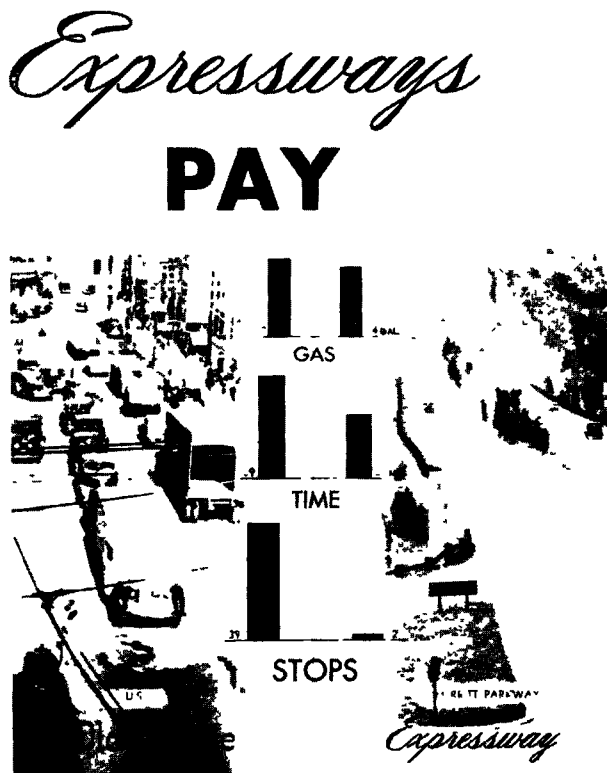


Figure 1.

and a controlled access highway. The bars emphasize the savings to motorists when using expressways. Here is a good argument for the expenditures necessary to build such facilities. However, the chart has its faults; it actually covers too much. It was not necessary to give figures with the bars. The printing could also have been better, although the old and new style lettering is clever and emphasizes the contrast.

The matter of printing is most important. There have been many reports published with excellent subject matter, but printed so poorly that most effectiveness was lost. Appearance of the report should never be sacrificed because of a relatively small advantage in cost.

Figure 2 shows an excellent chart that tells an effective story of the difference in actual and constant dollar values of state construction expenditures. The dark bars in the chart were black in the original and the gray were red. The choice of colors was such that there is contrast if the chart is reproduced in black and white. Even in this

photograph Figure 2 has a good appearance. It is simple, easily understood, and reproduces well. It follows the five items basic to every chart.

Figure 3 is also taken from an early report. As in Figure 2, this shows construction expenditures; but there the resemblance ends. The designer tried to cover too much territory. Expenditures for all systems are included together with an indication of the amount spent each year. No horizontal scale is given so width of the figures means nothing, except for comparison. It certainly is not legible. It would be difficult to reproduce well.

Figure 4 is an excellent chart. It is extremely simple in form but brings out the growth of motor vehicle ownership since the early days of the automobile. The two major colors were red and black in the original chart but the black and white version still looks clear cut and has good contrast.

Proper use of color cannot be emphasized too much. Colored charts are particularly effective when used in talks before various groups. However, not all interested people can be reached in talks and some sort of publication is needed that will cover the same ground. Publications in color are usually expensive in small printings so it is necessary to go to black and white. This is the reason for the insistence on good

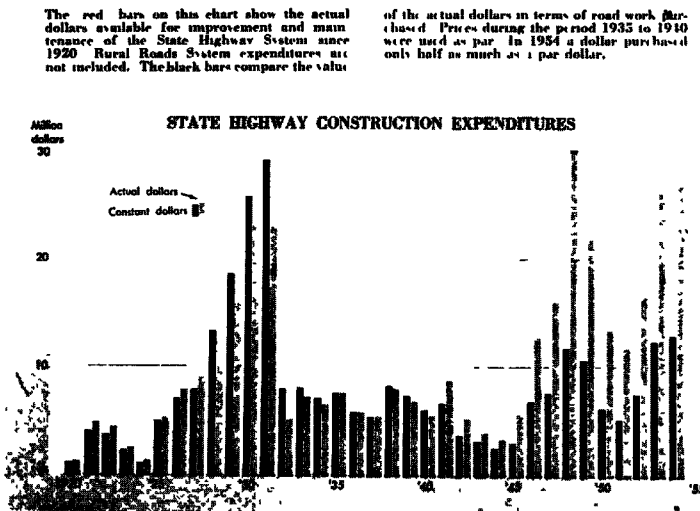


Figure 2.

contrast when color is used. It can be obtained but the colors must be chosen carefully and the printer instructed to obtain good contrast.

Figure 5 illustrates the lack of contrast in that the bars in this chart representing mileage and programs are so similar that it is impossible to tell them apart in black and white. Otherwise, the chart is good and brings out its message well.

Figure 6 covers part of the same subject as Figure 5 but illustrates a different method of presentation. Two colors and black were used in the chart and the chart had a good appearance in the report. It is also clear in the photograph used for this article.

Both figures 5 and 6 use percentages to develop the point in question. This method shows the relative positions of the various highway systems but does not show the actual travel on the systems. One of the most important factors in motor vehicle travel is the low traffic volume on the tertiary roads and streets. This fact could well be brought out in a supplementary chart giving the average daily volume of traffic on each of the systems in the state.

Figure 7 is one of the best conceived and executed charts found in all the reports. In color it is excellent. It shows the increase in federal-aid authorizations over the years, and how they have grown from nominal amounts to major sums that have had an appreciable effect on the financing of state highways. If the authorizations of the 1956 Act were added, especially those for the interstate system, the bars for the 1957-1959 fiscal years would be several times the longest now in the chart.

This chart illustrates another fact that should be brought out graphically in every needs study presentation: the important role that federal-aid for highways will play in the financing of highways.

Figure 8 was taken from a slide talk by the author given some two years ago. The slide was photographed in color from a chart. It was one of a series of slides and illustrates one point in the discussion. When the talk was later printed, a separate

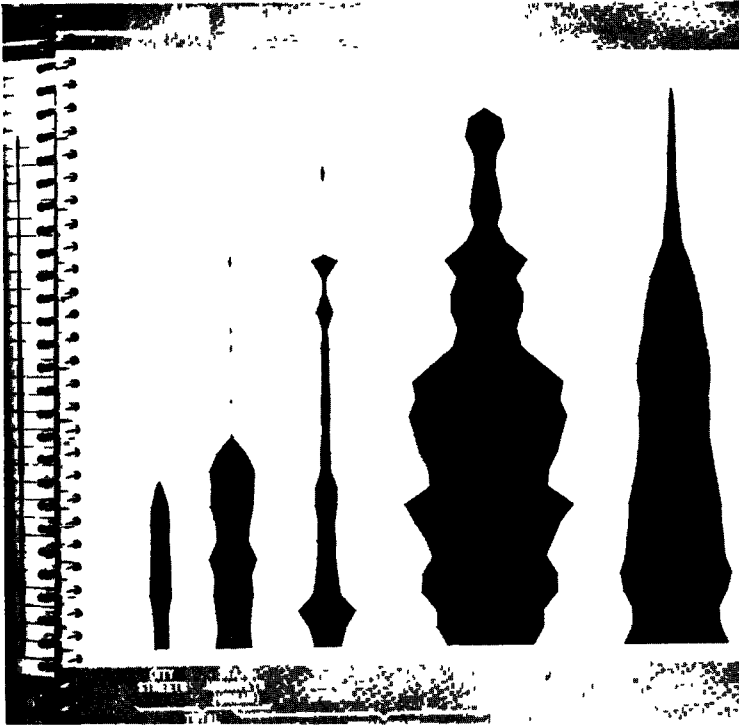


Figure 3.

black and white drawing was made of the slide. This is the best method to use when charts are very simple. The extra work required for an illustration such as this is not great and achieves a much better appearance.

The original color chart from which the slide was made still retains legibility when photographed in black and white, as was done for this paper. However, because the color used as background was not chosen with an eye for black and white reproduction, it photographed much too dark. A negative appearance was obtained, unsuitable for most publications. It was effective only as a slide.

The illustrations accompanying this article show only a few of the considerations in developing good non-technical charts. They cover charts taken from published reports and may, or may not, have been used in oral presentations to various groups. To secure adoption of a long range plan, it is necessary to reach as many citizens as possible. They should have full knowledge of the facts behind each highway needs study.

Good coverage cannot be obtained with the limited number of formal reports usually published. Supplementary booklets sometimes published for educating the general

public are useful but are far more effective if given out following a talk before some civic group where the entire program was discussed.

Charts for reports fall into two classes: those for the printed report, and those for oral reports to group meetings. Through those two media, and most important, through newspaper stories, a maximum number of people can be reached in the state.

There are certain features common to all such charts that have not received full attention. The designer should never try to get too much information on one chart. This is repeated here for emphasis. It is far better to develop a series of charts, each bringing out one point. The use of overlays is particularly effective with charts accompanying talks. Occasionally, they have been used in reports but without the same effectiveness.

Color should be used extensively because more dramatic pictorialization can be obtained. It can be used as background, in letters or numbers, or to emphasize an important word or phrase. The entire chart can be developed by art work to give excellent results.

Color is difficult to work with if literature reproduction is planned or if a slide is to be made. What may look good on a chart may appear quite differently when

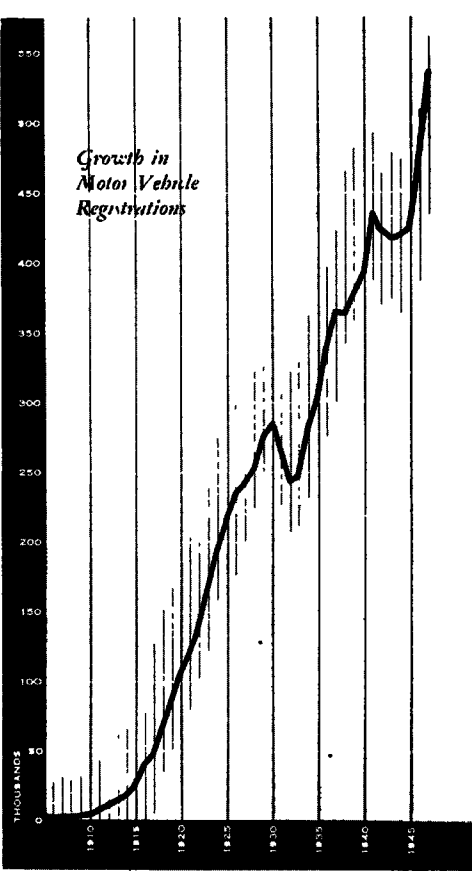
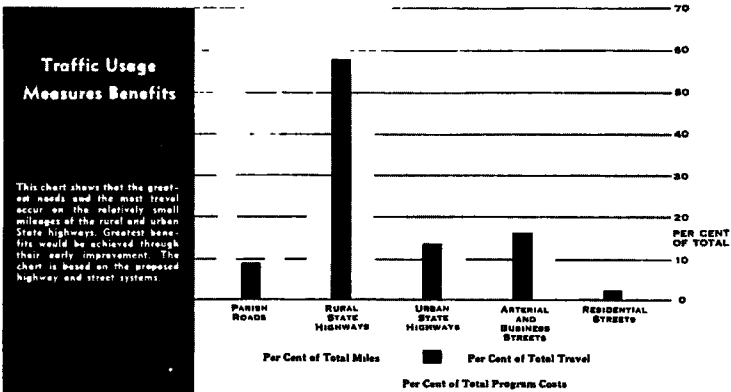


Figure 4.



Total program costs for the proposed arterial and business streets are distributed by population groups in the following table

residential streets will be dependent on the desires local people and their willingness to raise funds for the purpose

ANNUAL PROGRAM COSTS
Proposed Arterial and Business Streets

Parish Road Programs
To bring the 22,437 miles of existing parish roads

Figure 5.

photographed for a slide to be projected under strong light. Shades selected for contrast with each other give excellent contrast when reproduced in black and white.

Lettering for all charts should be easy to read. When type is to be used in the chart or for captions for printed reports, the type should be selected to blend with the pictorial matter.

Analysis has revealed that no single action can solve the problem, a variety of things must be done. Essential steps are presented in this summary

According to criteria established for the study, discussed in the Classification chapter, there are 38,000 miles of rural roads which are of community interest. Of these, 7,500 miles were found

TRAVEL VARIATIONS BY SYSTEMS

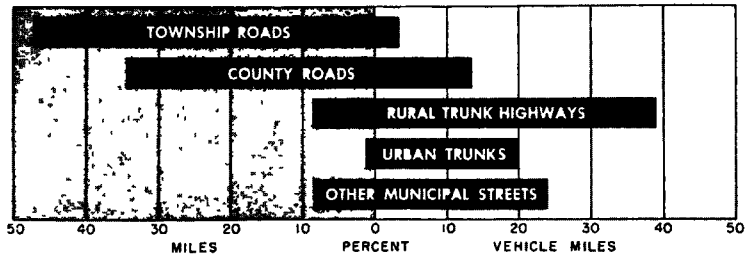


Figure 6.

secondary system of 4,647 miles and state-maintained routes which were part of the federal aid secondary system of 2,434 miles

All monies made available under the 1948 act remain to be programmed by the state and the counties

Post War Federal Aid Established A New Level

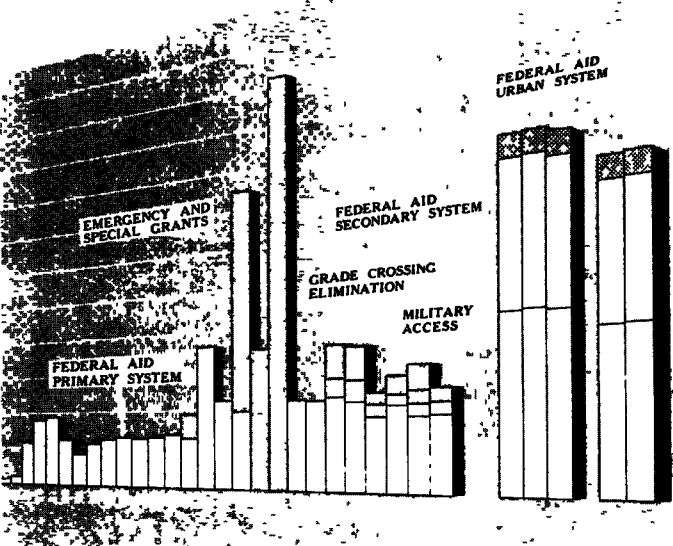


Figure 7.

In the case of charts for newspaper use, it will often be advisable to prepare special black and white charts covering the same subjects as the colored ones (Figure 8). The

separate charts can be prepared with little extra work by drawing or tracing them from the colored charts. This procedure will give sharp, clean lines that will reproduce well in newspapers and inexpensive folders.

In preparing charts for use in oral presentations, the usual relationship of lettering and context must be ignored. The letters should be of such size that they can be read by someone sitting in the back row of a meeting room, anywhere from 30 to 60 ft or more from the chart. A minimum of $2\frac{1}{4}$ in. letters has been found to be the best.

With this minimum size letter, the charts must be fairly large. A size about 20 to 24 in. is easy to handle yet legible to small groups. A larger size is preferred if slides are to be made from the charts or large groups are to be addressed. Considering the sizes of letters necessary for legibility it can be seen that there is room for only a small amount of written material. There should be very little lettering on any pictorial chart. This limitation is generally beneficial in that many charts attempt to crowd too much information into too little space.

SUMMARY

Charts for highway needs study reports have improved considerably since the first report was published. However, there is still room for improvement particularly with regard to scope, legibility, choice of colors, and simplicity.

Each chart should have a single concept, and should be legible and attractive. If these basic rules are followed, the highway needs studies will be accepted more readily by the general public and those who must support the finding. If general acceptance of the report can be gained, it will be easier to secure adoption of the recommendations, which is the aim of any study report.

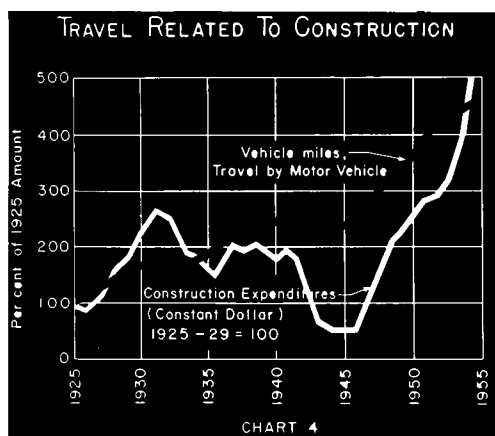


Figure 8.