

An Evaluation of the Aesthetics of Junkyard Screening and Billboard Densities

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I think that I shall never see
A billboard as lovely as a tree
Perhaps, unless the billboards fall,
I shall never see a tree at all.
Ogden Nash

INTRODUCTION

The American public thinks of its highway network as a necessary convenience but rarely gives much thought to roadside environment. Yet, driving for pleasure is one of America's most popular outdoor recreational activities. This area, however, has recently been brought into sharper focus. President Johnson, when recently discussing highway beautification said: "By making our roads highways to the enjoyment of nature and beauty, we can greatly enrich the life of nearly all our people in the city and countryside alike."

The culmination of an aroused and concerned interest by both Congress and the public may be seen in the Highway Beautification Act of 1965, which provides for mandatory controls by the states over both junkyards and billboards along the roadside. Failure of a state to comply with the provisions of this act means the risk of loss of ten per

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cent of all federal-aid highway moneys normally apportioned to the state.

While such a program of action may seem drastic, it reflects a slow, steady buildup of public opinion and concern. We have long been exposed to the cartoonist who would ridicule by caricaturizing the roadside as a jungle of billboards fit only for screening the police motorcycle patrol, and the newspaper editorials calling for a cleanup of the ugliness along our roads.



Fig. 1. From the Indianapolis Star, Jan. 21, 1968.

Earlier than might have been expected, or now remembered, others were also following this same interest. In 1934 the American Municipal Association was concerned enough to issue a policy statement concerning junkyards. In 1939 the National Resources Committee studied the roadside problem and recommended a policy for control of or protection from the then developing roadside clutter. The National Roadside Council, in 1946, also recommended policies for control of roadside protection. The annual AASHO meeting in 1947 heard how New York State was handling its outdoor advertising problem; while in 1950 this was one of the topics studied at the 11th Annual Highway Engineering Conference in Salt Lake City.

Groups other than those directly involved with or interested in highways have also taken official interest in this area. In 1950 the

Garden Club of America and the American Museum of Natural History issued a plea in their joint report *Conservation Please*.

In 1950 and 1951 methods of possible control were studied; the National Roadside Council studied the possibilities of voluntary cooperation while the American Automobile Association proposed and studied other techniques for protection and betterment.

Attempts have been made in the past to relate other aspects of highway transportation, such as safety, to outdoor advertising. One such case was a study by the State of Minnesota during the years 1947-1949, reported by Paul Staffeld in 1953. This study showed a high correlation between accidents and roadside design features but very low correlation with advertising signs. A more recent study along a section of the New York Turnpike by the firm Madigan-Hyland of New York showed a substantial correlation between the occurrence of accidents and outdoor advertising signs. However, in testimony before a Congressional Committee, this conclusion was questioned as possibly being in error due to improper statistical analysis. Several others have investigated this same question, such as Dr. Blanche of the New York University Center for Safety Education, and have come to the same general conclusions as the State of Minnesota study reached—that

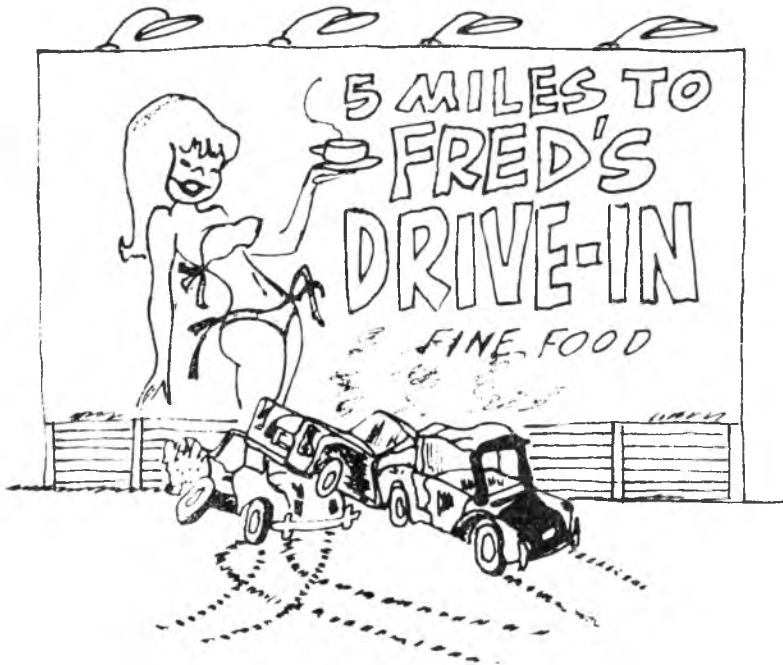


Fig. 2. From the Indianapolis Star, Jan. 21, 1968.

accidents have virtually a zero correlation with outdoor advertising signs.

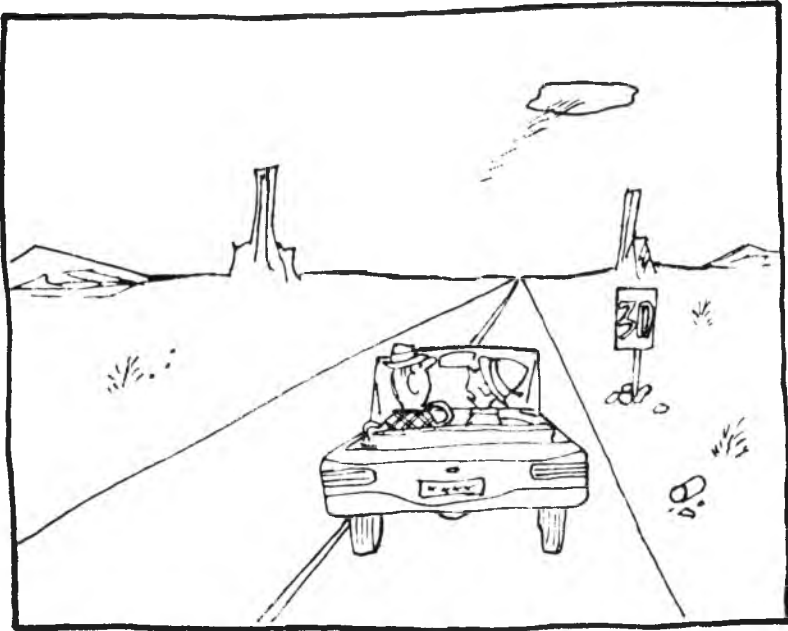
However, it is the question of aesthetics and visual pleasure which has received most of the attention recently, indeed it has been a source for debate by an ever increasing segment of public opinion for several years now. In 1953 the American Society of Planning Officials discussed this question in relation to junkyards, while landscaping and roadside control, including billboards were being analyzed during the same year in a report from Rutgers University.

This activity and interest found eventual expression in one of the provisions of the Federal-Aid Highway Act of 1958, although only billboard control was provided for. This provision was for a half per cent bonus above normal federal highway aid for those states that would enter into a voluntary agreement to control billboards along the interstate system. As last reported (1967), 25 states had signed up and received \$1,936,000 for control of 725 miles of interstate; final payments under this provision are expected to eventually reach \$62 million.

This provision, if anything, stirred more commentary on the many aspects of highway beautification and also prompted the first real expression of adverse opinion to many of the previously promoted ideas. The controversy has even produced its own version of best sellers in Peter Blake's *God's Own Junkyard*, and Donald Appleyard, Kevin Lynch and John Meyer's *The View from the Road*. However, the most articulate expression of opinion, if not the most widely known one, is found in Christopher Tunnard and Boris Pushkarev's *Man-Made America—Chaos or Control*, which seems to have served as the inspiration for others, many since that date—1963.

By 1964 it was realized by many that the voluntary provisions of the 1958 act were not achieving the desired results. The outcome of a study undertaken at that time is found in the mandatory controls of the 1965 act previously noted.

The new act has caused an even more forceful and meaningful debate and has caught the public interest much more than any previous activity in this field. Americans are now becoming aware of and many are becoming concerned about the view from the road—in terms of what it is and what it might be. Also, many of the directly effected concerns—the outdoor advertising industry, users of outdoor advertising such as motels and restaurants, junkyard owners, etc. are now speaking up. Then too, many people are questioning the basic assumptions of necessity or usefulness of the controls, particularly in light of the costs of the program. Still others desire even further controls or are opposed



"You know what this highway could stand? A few billboards!"

Fig. 3. From the Chicago Tribune, Oct. 13, 1967.

to provisions that allow *any* junkyards or billboards to remain or provide compensation for any removed items.

As pointed out by the American Public Works Association in its testimony before the House Subcommittee on Roads during hearings on the bill in 1965, "‘Beauty,’ it has been said, ‘is in the eye of the beholder.’ There can be no precise set of criteria to describe what is aesthetically attractive and what is not. We will always have a certain amount of controversy, particularly in urban areas, regarding the aesthetic appeal of specific projects. One group will say that a facility is beautiful; another will insist that it is not. It is, to some degree at least, a matter of taste."

It is this area of aesthetics as related to some of the aspects of both junkyards and billboards that this project has endeavored to study. While this will by no means supply the complete answer to the many and varied questions raised by the 1965 act, it will aid in a better understanding of the questions of public taste and preference.

Prior to this project little, if any, work had been done on measuring and quantifying the public's attitude towards its environment—particularly beyond the scope of laboratory experiments or simple opinion

surveys. This particular project has concentrated upon only a very narrow segment of the environment—basically it is an attempt to answer the question, do billboards and/or junkyards, in any manner, influence an individual's aesthetic appreciation and enjoyment during the highway driving experience?

The study divided the question into two separate parallel questions, logically concentrating upon billboards in one and junkyards in the other; both investigations were conducted in a very similar manner, the only differences being highly technical ones in the analysis of the data collected.

EXPERIMENTAL PROCEDURE

A color motion picture was prepared; the objective was to show typical roadside views, as are found throughout Indiana, and then determine how the varying evidence or presence of junkyards or billboards affects individual aesthetic enjoyment or appreciation of the view—if at all.

Two separate films were prepared. In studying billboards, the emphasis was on varying densities or occurrences of billboards. In studying junkyards, the emphasis was on the degree of screening or exposure of a junkyard.

As an aid in selecting sites to film, the inventory prepared by the Indiana State Highway Commission for its report to the Bureau of Public Roads was used. This inventory identifies all junkyards and billboards along the entire interstate and federal-aid primary highway system in Indiana and provides other information such as size, distance from ROW, etc. The inventory identified a total of 42,144 signs and 410 junkyards as of May 1966.

Of these totals, some billboards and junkyards were eliminated from consideration either as being in urban areas or not being covered by the provisions of the 1965 act by nature of the land use classification of their sites. Field inspection followed, during which time an estimated 80 per cent of the billboards and 95 per cent of the junkyards in the state inventory were viewed with the intention of possible inclusion in one of the films.

In choosing locations for filming, sites with billboards were sought that had densities—expressed in terms of billboards per mile—ranging from less than two to more than 40. In addition, a fairly uniform distribution was desired both as to size and spacing for any given density. Sites for filming junkyards were sought with screening ranging from none to 90 per cent; it was felt that screening greater than 90 per cent would appear as something other than a junkyard and reactions would

be to the vegetation only. In addition, junkyards with uniform screening for any given level of screening were desired. Sample selection proved to be the most difficult and time consuming portion of this project and later problems with the junkyard portion of the project can be partially traced back to this problem.

An electrically powered 16 mm movie camera was used for the photography; it was stabilized by an electrically driven gyroscope and handheld in the passenger seat of an automobile, driven at average traffic speeds for the facility in question. (Speeds ranged from 50 to 55 mph.) Kodak ECO film was used throughout the project—this is a commercial grade of color-original film used when copies are to be made.

Film sections of approximately the same time length were then sorted and classified according to the densities or percentages depicted. These were then arranged to form films for presentation, each according to the method required by the analytic procedure used.

DATA COLLECTION

The assistance of various groups around the state was solicited; groups such as the Kokomo Chamber of Commerce, the Terre Haute Lions Club, and the Columbus Jaycees were contacted and agreed to take part in the project. Participating groups were given a very carefully worded introduction to their task and then shown the film. Each individual was asked to indicate his own response on a self-coding form on the bases of the instructions given verbally before the presentation. For the billboard film presentation the task consisted of rating with a scale of descriptive adjectives each of a series of 24-film sections. For the junkyard film presentation the task consisted of expressing a preference for either the first or second view for each of ten pairs of views shown plus indicating the desirability of each of five views individually. In addition each individual was asked several questions about himself, about some of the things he does when traveling and about his opinion on several related subjects.

DATA ANALYSIS

The analysis of the response data gathered with the aid of the films is based upon modern psychophysical theory, as developed during the last 30 years in the field of psychology. The techniques used may be traced back to the work originally done by L. L. Thurstone and his proposed "Law of Comparative Judgment"; they are generally referred to as psychological-scaling methods. For a discussion on the develop-

ment and application of this theory the reader is referred to any number of standard texts, including two in the bibliography of this paper.

The specific techniques used in this project were those known as "Pair Comparisons" for the junkyard film and "Successive Categories" for the billboard film. Each technique has similar steps involved in the analysis; the first step being the construction of a judgment matrix consisting of the proportion of times a stimulus (film section) is judged to be in a category or judged greater than another stimulus. This proportion matrix is transformed to a normal deviate matrix which may be said to represent estimates of the relative scale position of each stimulus. These estimates are used to determine the relative separations for all possible pairs and in the pair comparison case to then directly evaluate the relative psychological scale positions of each of the stimuli. In the successive categories case these estimates are used to evaluate the scale positions of the various rating category boundaries which are then used along with the frequency distribution of the normal deviates for each stimulus to arrive at scale values for the individual stimuli.

In each procedure a statistical test of internal consistency is made in order to check the assumptions of normality and equality of dispersions. In the event these assumptions are not valid the procedure is altered by using measures of individual dispersions to correct the resulting scale values. Another statistical test is then made to check on the validity of the results for the data used. The final step in each of these particular cases, as a physical scale is available, is relating the derived scale values to the observed measurements of density or screening by regression analysis.

DATA SUMMARY AND ANALYSIS

Billboard Film

The initial attempt at analyzing the response data for all individuals grouped into one sample resulted in a Chi Square test of internal consistency that was not significant beyond an alpha level of 0.99. This would seem to indicate that for the sample taken, it is necessary to adjust the scale to account for the differences caused by unequal variances and deviations from normality. Examination of the response data after this discovery indicated two problems previously feared; however it was possible to take steps to correct them.

In the analysis it became necessary to eliminate one point or stimulus from consideration as it did not seem to fit with the rest of the data. This was understandable as it was a stimulus that suffered from a poor quality of photography and did not appear to adequately represent the

billboard density associated with it. In addition two end values on the density scale had been used in the film that were not on an equal interval scale with the others but were attempts to bridge a lack of data for intervening points, these two were discarded in the final analysis.

The resulting statistical test then gave a Chi Square value that was not significant beyond an alpha level of 0.85 and in a test for homogeneity of variance (equality of dispersions) the resulting Chi Square value was not significant beyond an alpha level 0.85. This indicates that both assumptions were valid and a reliable scale has been created for the stimuli included. This scale was related to the physical scale of density by regression analysis, the results gave a correlation coefficient of 0.959 or R square of 0.920 for linear regression indicating a fairly strong relationship between the two scales. Higher order equations were tried but did not substantially improve the relationship. This relationship is shown in Figure 4.

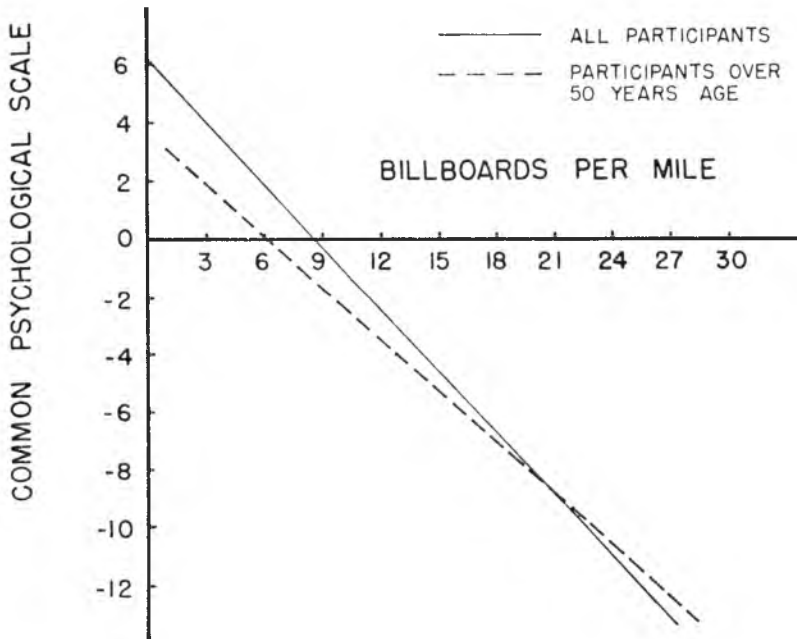


Fig. 4. Scale Values for Billboard Density.

Junkyard Film

The analysis of response data for the junkyard film yields two individual scales; one the absolute value for each of the stimuli in terms of a meaningfully located zero point for the scale; the other the

relative separation of the stimuli along a psychological scale. Regression analysis is used to relate the two scales and eventually arrive at estimates for scale values for each stimuli on the psychological scale.

The resulting statistical test gave a Chi Square that was not significant beyond an alpha level of 0.975 but when adjustments were made for unequal dispersions the test was not significant beyond an alpha level of 0.85 indicating that a reliable scale had been created after adjusting for unequal variances.

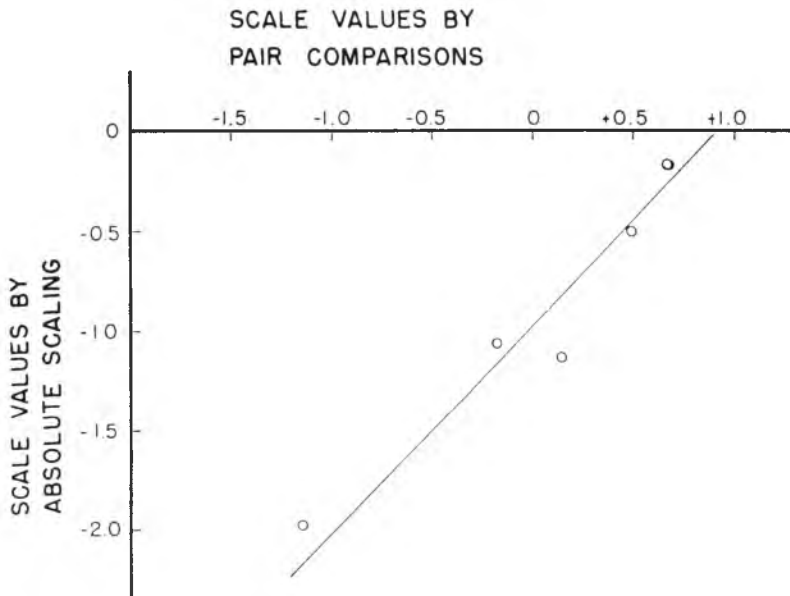


Fig. 5. Linear-Transformation Function to Locate a Meaningful Zero Point.

Linear regression with the absolute scale, as shown in Figure 5, had a correlation coefficient of 0.955 or R square of 0.911 yielding the relationship:

$$\text{where } M_{z_3} = 0.923a_j + 0.895$$

where M_{z_3} = scale values by pair comparisons assuming
Case III

a_j = scale values by relative scaling

From this relationship it is now possible to determine the value on the M_{z_3} scale that corresponds to $a_j = 0$; the constant term is actually the Y intercept and the value of M_{z_3} that represents indifference. Thus all of the scale values are less than zero on the adjusted scale.

This adjusted scale is then related to the physical scale of per cent junkyard screening by regression analysis, the results are shown in Figure 6. This figure indicates the resulting linear regression line for the points shown; it has a correlation coefficient of 0.640, which is considered low and indicates only a portion of the measured difference in responses may be related to a measurement of the degree of screening for the junkyards used.

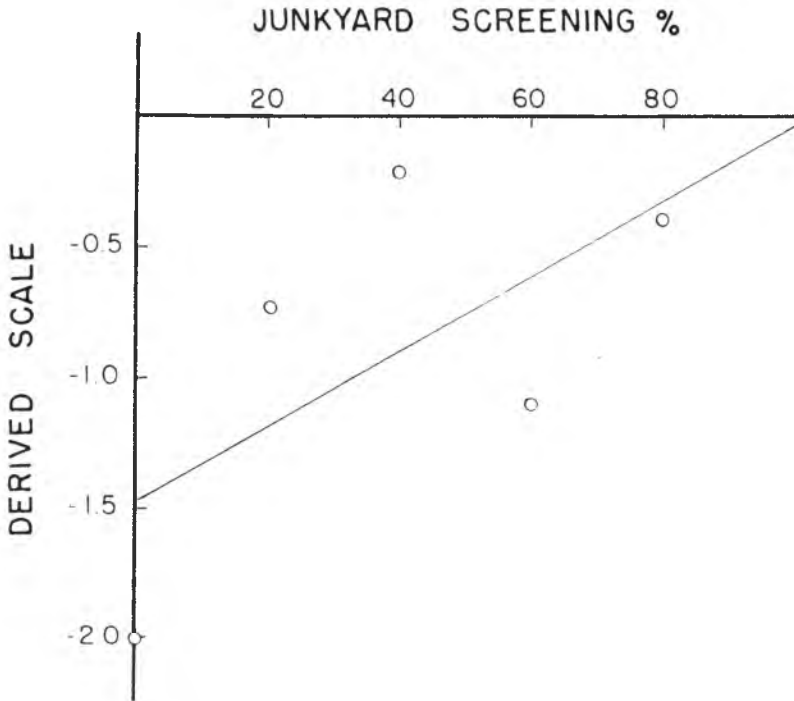


Fig. 6. Scale Values for Junkyard Screening.

Analyses Summary for Films

The discarding of a few of the stimuli from the analysis for the billboard film presented no problem in practice nor did it conflict with the theory of the analytical technique used. It was expected at the outset of the project that attempts to extend the billboard density scale on the high end might not prove successful, particularly as the stimuli chosen for this purpose were not on an equal interval scale with the remainder of the sections used. The resulting improvement in internal consistency after eliminating the stimuli judged unsatisfactory due to poor photography and the stimuli on the end of the scale indicates that

the area of main concern has been well covered according to the original objectives of this project. The resulting scale relationships, Figure 4, also indicate little need for any additional extension to the density scale outside of the range already studied, in effect zero to 27 billboards per mile.

The junkyard film suffered from a lack of suitable sites for filming, particularly in terms of covering the complete range of screening percentages. A site with 100 per cent screening was not included as it was judged that such a site would not be identifiable as a junkyard. Most sites inspected were turned down due to adjacent features which made them unsuitable for filming. This, coupled with the small sample size of junkyards used, partly accounts for the fairly inconsistent relationship as indicated in Figure 6, and by the low correlation coefficient. Further considerations, probably accounting for some of the variance previously mentioned, include the possibility that the relationship is multidimensional rather than unidimensional as assumed here—a consideration not possible to investigate with the data collected. The very strong measure of internal consistency, however, does indicate that some factor or combination of factors, including the one studied, is related to the response pattern.

Questionnaire Data Summary

Many other questions were asked of the participants, partly for the purpose of trying various classification groupings in the analysis of the response data, and partly to determine opinions and preferences as related to several questions.

For the first purpose information such as age, sex, income range, education, number of cars owned, number of miles driven, number of credit cards used, etc. was collected for each individual. Using various levels and combinations of these factors, analyses of the response data were performed in an attempt to study any systematic variance. Some such variance was found, but the general relationships found for both films did not change.

For the second purpose several opinion questions were asked; the results of a few are presented here. When asked to rank a number of factors influencing the choice of a place to have a meal and the choice of accommodations, both while traveling, the participants as a group ranked billboards last or second last in a list of ten items; in addition, only 20 to 22 per cent of the participants even bothered to rank billboards at all while over 90 per cent of the participants did rank one or more factors.

In another section, participants were asked to indicate which of a list of statements of opinion they agreed with or that represented their own opinions. A short summary of these responses shows 26.2 per cent of the participants found billboards interesting views and 24.1 per cent found them ugly views along the roadside. Some 50.7 per cent relied on billboards as an aid in finding services and 19.0 per cent did not, 44.5 per cent thought they were necessary and 18.6 per cent thought they were not; however, 13.8 per cent thought all billboards should be removed from the roadside while 63.8 per cent agreed many but not all should be removed and 19.0 per cent felt they should not be removed at all. There were 2.8 per cent who indicated that junkyards were interesting views and 81.8 per cent who indicated they were ugly views along the roadside, while 76.3 per cent felt junkyards should be fenced and screened so as to hide them from view from the road. Additionally, some 45.6 per cent felt that junkyards should be removed from the roadside while 3.5 per cent disagreed.

It should be pointed out that the percentages for apparent opposite opinions do not total exactly 100 per cent as there was no forced choice, indeed an individual was free to agree with two opposite positions on the same question, but few did. Additionally, people did agree that junkyards should be screened and also removed so that there is some duplication here. There was also a total of 6.2 per cent of the participants who did not indicate a preference for a single statement out of the list of 15 presented, probably due to omitting the question altogether.

It is interesting to note the general agreement favoring screening or removing of junkyards along the roadside which is in qualitative agreement with the response data from the film presentation. The billboard question is more confused in that the pattern of opinions indicates people use billboards and even feel they are necessary but still are of the opinion that most should be removed from the roadside.

CONCLUSIONS

The strong relationship reported for billboard density would seem to indicate the public finds any increase above zero to detract from their general aesthetic appreciation and enjoyment of the view; it also indicates a general and strong dissatisfaction with a situation where the density exceeds 8.7 billboards per mile. This is the average for all participants; however, when individual groups are examined, such as those grouped by age ranges, a lower value results from the analyses for some groups. The group over 50 years of age has a characteristic value

of 6.0 and those under 35 years have a characteristic value of 7.5 billboards per mile.

This, coupled with the opinion pattern reported for the questionnaire, would seem to indicate a general public preference or perhaps tolerance for a small number of billboards along the roadside to perform needed information functions. This does not preclude the possibility that the need for information could be satisfied by other means including officially erected signs, such as has been proposed. However, it does indicate a very strong desire for some form of information conveyance to the traveling public as related to services.

It should also be pointed out that there is no knowledge, or even inference, of what the effect of a very even, regular spacing of billboards at any given density might be. It is entirely possible such a situation would completely change the response pattern uncovered in this investigation.

The relationship reported for junkyard screening, while not being well quantified, does indicate a qualitative preference for greater degrees of screening and the apparent dislike for any obvious presence of junkyards. This is, as previously mentioned, similar to the conclusions drawn from the opinion portion of the questionnaire. Taken together these factors present a strong argument for effective control and screening of junkyards along the roadside.

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