

National Highway User Survey

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National Quality Initiative

NQI

Steering Committee

Introduction

In 1992, Federal, State and highway industry representatives collaborated in the creation of a National Policy on the Quality of Highways. The focus of this policy is to enable the United States to maintain its leadership role in providing quality highways by providing "a durable, smooth, safe, aesthetically pleasing, environmentally sensitive, efficient, and economical highway system."

During the past few years, there has been a major commitment within the highway community to promote and achieve new levels of quality in the construction and maintenance of our roadways. The voice of the customer, however, must provide the direction for any serious and concerted quality effort.

The National Quality Initiative Steering Committee recently commissioned a survey, funded by the Federal Highway Administration, to determine the general public's satisfaction with the nation's highway system and to identify the public's priorities for highway improvement. This report provides the results of this survey.

The members of the Steering Committee believe that the findings will provide a valuable framework for federal, state and industry officials to work collaboratively in the pursuit of quality in our highway system. They also believe that this first nationwide customer satisfaction survey provides a valuable baseline against which to measure improvement.

Background of Survey

*NQI Steering Committee formed
in 1992 to promote the quality
construction of the nation's
highways*

NQI Long-Range Plan

- *Disseminate information on quality*
- *Recognize quality achievements*
- *Promote continuous quality improvement*
- *Assess public satisfaction with highway system*

About the NQI Steering Committee

In 1992, representatives of industry, state transportation officials and the Federal Highway Administration met to establish a national initiative to promote the quality of our highway system. This "National Quality Initiative" represented a major commitment to promote the partnership of all the entities that participate in the funding, design and construction of our highways.

This collaboration resulted in the creation of the "NQI Steering Committee," composed of representatives of the Federal Highway Administration, the American Association of State Highway and Transportation Officials, the American Public Works Association and the following industry groups:

- American Concrete Pavement Association
- American Consulting Engineers Council
- Associated General Contractors of America
- American Road and Transportation Builders Association
- National Asphalt Pavement Association
- National Ready Mixed Concrete Association
- National Stone Association

The committee has met regularly over the past four years. It has sponsored a number of national and regional quality seminars and other promotional and educational activities. Similar quality seminars have been held in most states. As a result, the NQI has succeeded in heightening the level of cooperation and collaboration among the highway community and in stimulating the focus on quality among their constituent organizations and throughout the industry.

The NQI Long-Range Strategic Plan

The NQI Steering Committee developed a Long-Range Strategic Plan that has guided its activities in the first years of its operations. This document includes several key strategic objectives, including:

- Promoting and disseminating information on quality throughout the highway community
- Recognizing exemplary quality improvement efforts
- Maintaining national emphasis on the continuous quality improvement of highway facilities

An additional objective of the plan is promoting customer focus and measurement in the highway industry. This objective anticipated several specific activities:

NQI sponsored a telephone survey of the driving public to measure satisfaction with the nation's highways

- To conduct a nationwide survey to assess public satisfaction with the highway system
- To use the results of such a survey to provide direction in improving the highway system
- To track customer satisfaction over time to measure quality improvements

In August of 1995, the Federal Highway Administration awarded a contract to Coopers & Lybrand to design and administer such a public survey as part of its ongoing support to the NQI Steering Committee. Coopers & Lybrand, in turn, subcontracted with Opinion Research Corporation to conduct the actual survey. All parties agreed that the most reliable and efficient method for conducting a nationwide survey was by telephone.

Survey Design and Methodology

*Survey developed by NQI,
Coopers & Lybrand, and
Opinion Research Corporation*

*Telephone survey administered
from ORC's Telephone
Interviewing facility from
October 13 - November 1, 1995*

Survey Development

Initial input to the survey design was generated in a meeting attended by a cross-section of the highway community, including federal, state, and industry representatives, on August 31, 1995. During this working session, participants were asked to identify highway characteristics that they believed to be of greatest importance to highway users. The participants invited to this session had experience in dealing with public concerns with regard to the highway system and were asked to reflect this "customer" perspective in identifying potential measurement items.

Representatives of the NQI Steering Committee, Coopers & Lybrand and Opinion Research Corporation (ORC) used the output of this working session and other available sources of information, including NCHRP Report 329 of August, 1990, to construct a draft survey instrument. The entire membership of the NQI Steering Committee reviewed the draft from the perspective of the highway user.

The survey that was ultimately approved by the Steering Committee was designed to measure the following seven characteristics of the highway system. Each of these major characteristics was composed of a variety of discrete measurement items that every survey respondent was asked to assess.

- Bridge Conditions
- Maintenance Response Time
- Pavement Conditions
- Safety
- Traffic Amenities
- Traffic Flow
- Visual Appeal

The result of this effort was a survey that was pilot tested at ORC's Computer Assisted Telephone Interviewing facility in Tucson, Arizona in October, 1995. With a representative of the NQI Steering Committee in attendance, the survey was administered to a sample of households throughout the nation. The team made minor adjustments to the survey based on the results of the pilot. The survey was then ready for full administration.

Survey Administration

The survey was administered from the ORC facility from October 13 through November 1, 1995. To be eligible, those responding to the survey had to meet these two screening criteria:

Survey sampled households throughout the U.S.

- Be a licensed driver 18 years of age or older
- Have driven in the past year on a “major highway”

The phrase “major highway” was defined to include any of the following:

- The Interstate highway system
- Other multi-lane highways (expressways, freeways, and toll roads)
- Major two-lane highways

This definition reflects the primary components of our highways as stated in the National Highway System Designation Act of 1995.

Survey averaged 18 minutes

A Random Digit Dialing sampling frame was used to contact a representative sample of households in the U.S. (including Alaska and Hawaii). To maintain statistical projectability, one licensed driver was selected at a random for an interview within each sampled household by asking for the driver who had the most recent birthday. If the selected individual did not drive in the past year on a “major highway,” the interview was terminated, a replacement household contacted, and the screening process repeated. The response population was weighted to reflect Bureau of the Census norms for gender, age, race/ethnicity, education and Census Region.

Process resulted in 2,205 completed interviews

The questionnaire averaged 18 minutes in length. The process resulted in 2205 completed interviews, which provides a “+/-2%” margin of error for survey estimates based on the total sample. The community can have a great deal of confidence that the results reflect the public’s view of the highway system.

Profile of Respondents

In addition to asking survey participants to assess various dimensions of their experience with the highway system, the survey asked each participant to provide a profile of themselves and their driving patterns. These characteristics are of significant value in determining different levels of satisfaction among the population, which can be used to prioritize and target highway improvement efforts. Following are the characteristics used to develop a profile of survey respondents and the breakdown of survey participants under each category:

Gender:	Number	Percent
Male	1,074	49%
Female	1,131	51%

Age:	Number	Percent
18-34	781	35%
35-54	844	38%
55 and over	580	26%

Primary Trip Type:	Number	Percent
Commuting to/from work/school	668	30%
For Business	301	14%
Shopping/errands	568	26%
Recreation	660	30%
Other	8	--

Primary Type of Driving:	Number	Percent
Interstate Highway System	974	44%
Other Multi-Lane Highways	516	23%
Major Two-Lane Highways	715	32%

Majority of Highway Mileage:	Number	Percent
Urban	900	41%
Rural	964	44%
Equal Urban/Rural	312	14%
Don't Know	29	1%

Residence:	Number	Percent
Urban	1,119	51%
Suburban	529	24%
Rural	557	25%

Region of Country:	Number	Percent
Northeast	331	15%
North Central	601	27%
South	774	35%
West	499	23%

Vehicle Type:	Number	Percent
Car	1,446	66%
Van	206	9%
Sport Utility Vehicle	118	5%
Truck	379	17%
Other	56	3%

Major Findings

The public indicates a moderate level of satisfaction with the highway system

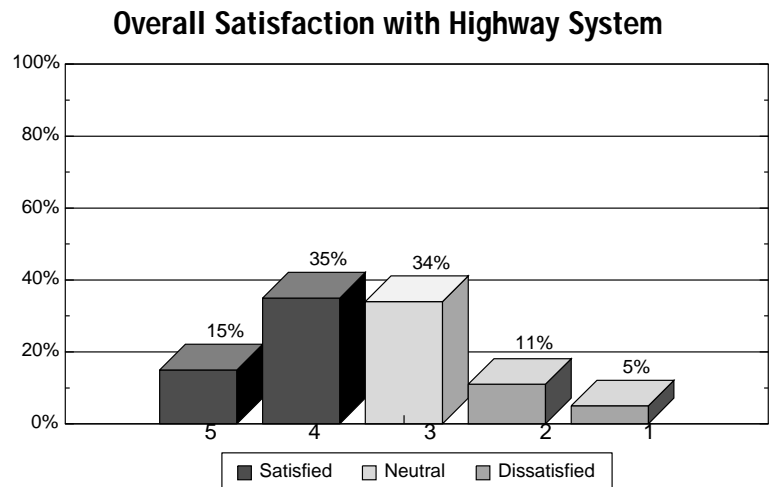
The large number of "neutral" responses indicates considerable opportunity for improving public satisfaction

This section of the report identifies the major findings of the survey, organized around four themes:

- Overall satisfaction with the highway system
- Satisfaction with characteristics of the highway system
- Priorities for highway improvement
- Public support for highway improvement

Overall Satisfaction with the Highway System

Respondents were asked to assess the various characteristics of the highway system utilizing a "1-5" rating scale, where "1" indicated "Very Dissatisfied," "3" indicated "Neither Satisfied nor Dissatisfied," and "5" indicated "Very Satisfied." The survey included one specific question that asked respondents to provide their overall satisfaction with the highway system. Following are the results of this question:



The percentages indicating "Dissatisfaction" with the highway system - those who answered this question either 1 or 2 - are not inconsistent with normal results of customer satisfaction surveys. What is unusual is the distribution of responses from 3-5. The 50% level of satisfaction is lower than would be expected in measuring products or services in a competitive market. And the percentage of "Neutral" responses is higher than usual. There is, however, no real "competition" in regards to the highway system, which perhaps accounts for this distribution of ratings.

While there is not an inordinately large number of highly dissatisfied "customers," there is considerable opportunity for improving public satisfaction with the highway system.

It is possible to analyze how the different segments of the population rate the highway system "overall." There are no statistically sig-

Different segments of the population do indicate differing overall levels of satisfaction with the highway system

Overall Satisfaction with Highway System

<i>North Central</i>	<i>55%</i>
<i>South</i>	<i>53%</i>
<i>West</i>	<i>47%</i>
<i>Northeast</i>	<i>41%</i>

nificant differences in overall satisfaction when analyzing the data by gender, age, primary driving purpose, type of vehicle, or area of residence. There are, however, some *statistically significant* differences when analyzing data by the other three characteristics:

Primary Type of Highway Driving:

- Those who drive primarily on "Interstate" highways indicate a higher level of overall satisfaction than those who drive primarily on "Major two-lane" highways

Primary Location of Driving

- Those who drive primarily in rural settings indicate a higher level of overall satisfaction than those who drive primarily in urban settings

Regional Location

- Those who live in the North Central area of the country indicate a significantly higher level of overall satisfaction than those who live in the Northeast and West
- Those who live in the South indicate a significantly higher level of overall satisfaction than those who live in the Northeast

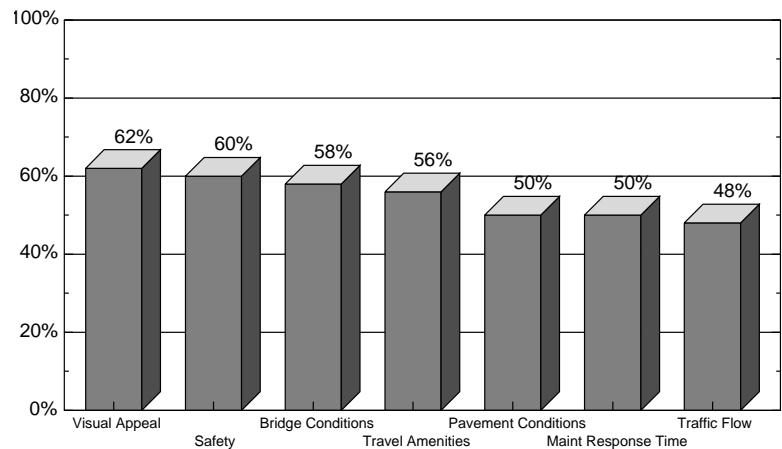
Satisfaction with Characteristics of the Highway System

Each of the seven major highway characteristics measured in this survey is composed of several distinct features. Respondents were asked to rate their satisfaction with each of the features identified with a given characteristic. After rating the features, they were then asked to provide an overall rating of satisfaction with the characteristic itself. To eliminate question order bias, characteristics (and their identified features) were presented to respondents in random order.

Following are the respective levels of public satisfaction with each of the major highway characteristics, where ratings of "4" (Satisfied) and "5" (Very Satisfied) are combined to reflect the overall percentage of satisfaction.

The survey results do reveal differing levels of satisfaction with the major highway characteristics

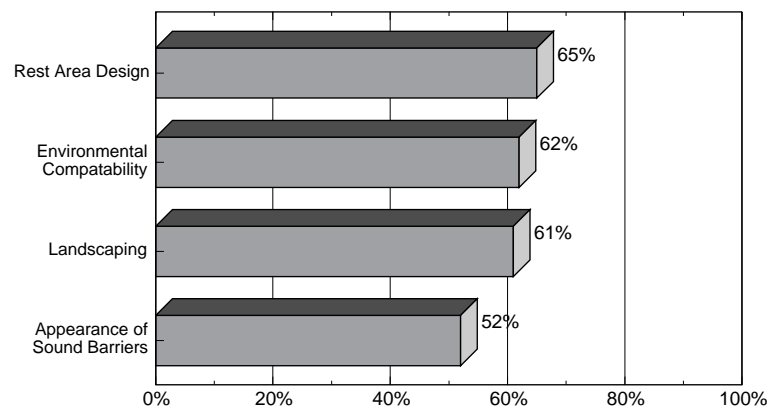
Satisfaction with Characteristics of Highway System



Following are the respective levels of public satisfaction with the features of each major characteristic.

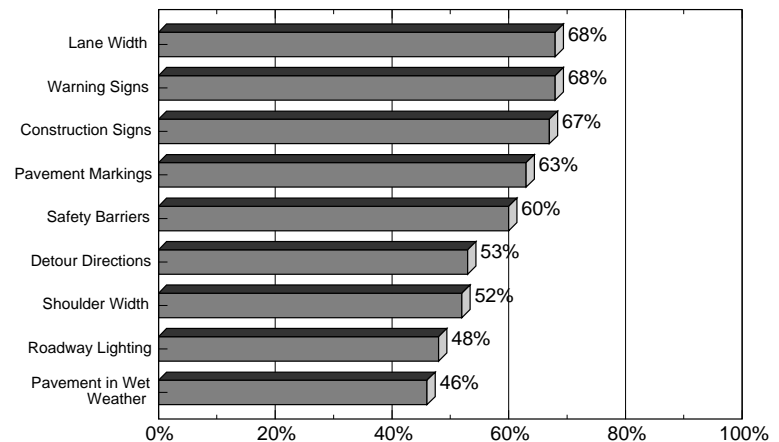
"Where sound barrier walls have ivy or green cover they look more attractive."

Satisfaction with Visual Appeal



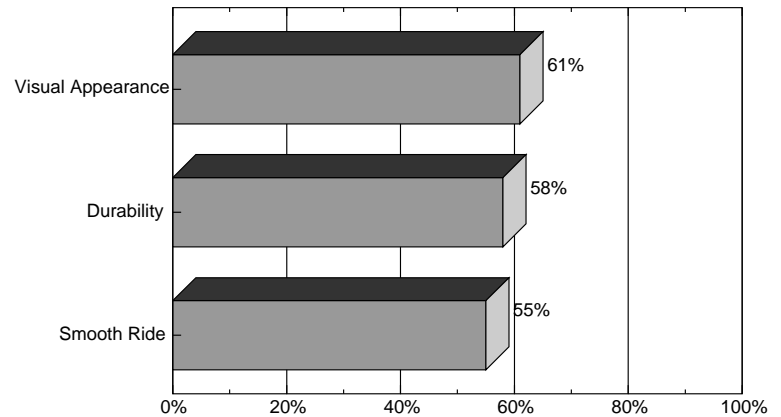
"When it's raining we need better pavement markings and better lighting."

Satisfaction with Safety Items



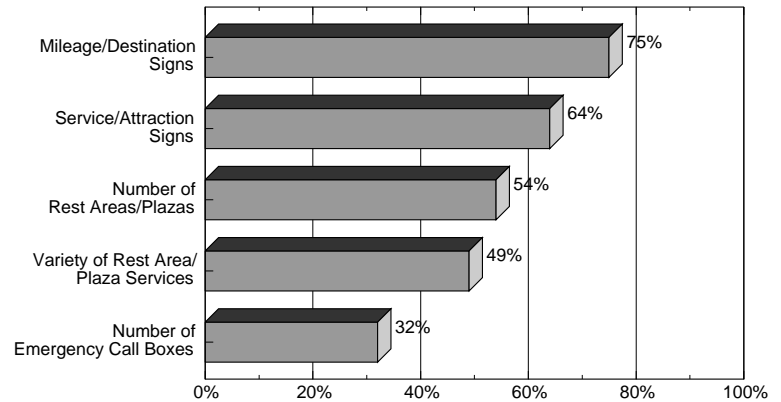
"Repair the bridges before they become unrepairable."

Satisfaction with Bridge Conditions



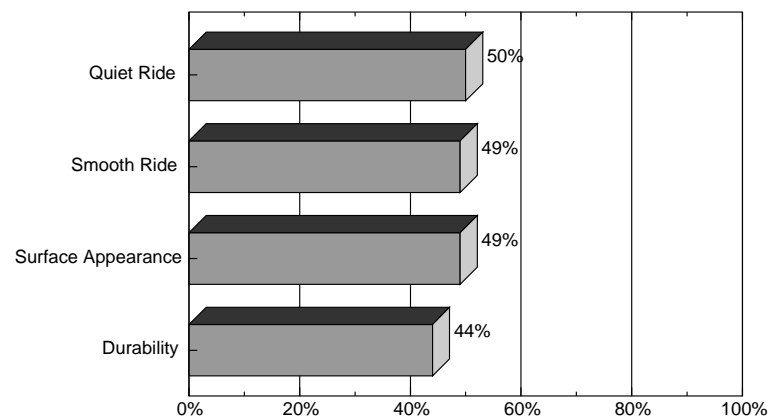
"I believe they need more emergency call boxes."

Satisfaction with Travel Amenities



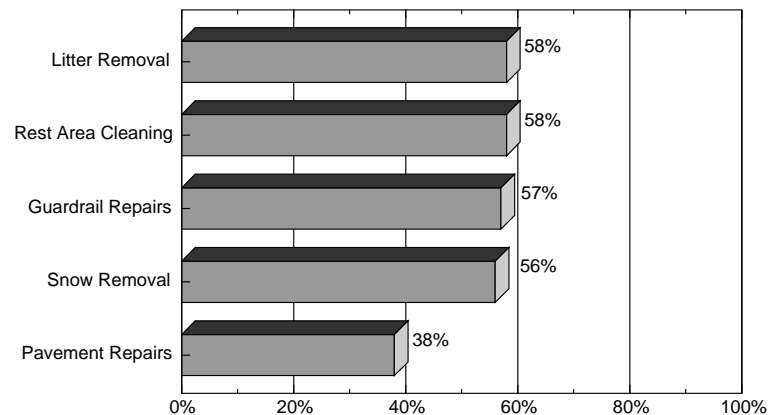
"Don't just do temporary repairs but repair the road permanently."

Satisfaction with Pavement Conditions



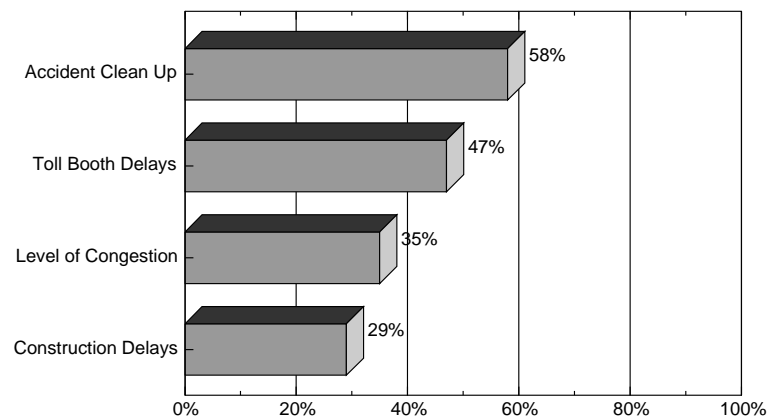
"Construction and repairs need to be completed in a timely fashion."

Satisfaction with Maintenance Response Time



"They should work on highways at night when there is no traffic."

Satisfaction with Traffic Flow



Priorities for Highway Improvement

Levels of *satisfaction*, while of value, do not provide sufficient direction in determining customer priorities for improving the highways. That is to say, it is not sufficient to look at the lowest levels of customer satisfaction and assume that those should be the focus of improvement initiatives.

Two approaches to determining the public's priorities for highway improvements:

- *Stated priorities*
- *Derived priorities*

Any good measurement approach must also identify the items that are of greatest *importance* to customers. Focusing on these items are most likely to increase customer satisfaction. The analysis of the results of this survey involved two approaches to identifying public priorities:

- Recording the *stated priorities* of those who participated in the survey, and
- Determining the *derived priorities* of survey participants by means of statistical analysis

Both analytical techniques identified the same three priority issues for raising public satisfaction with the highway system.

Stated Priorities

Each participant was asked to rank order the major highway characteristics from the standpoint of their personal preference for improvement.

The characteristics were presented as a series of randomly ordered pairs. For each pair respondents were asked to indicate which of the two characteristics those who build and maintain the nation's highways should concentrate on improving. Analysis of the results of all these "paired comparisons" revealed the following stated priorities on highway improvement, arrayed here in decreasing order of importance.

- Priority 1: Safety
- Priority 2: Pavement Conditions
- Priority 3: Traffic Flow
- Priority 4: Maintenance Response Time
- Priority 5: Bridge Conditions
- Priority 6: Travel Amenities
- Priority 7: Visual Appeal

Derived Priorities

Customer satisfaction research in commercial markets has shown that relying on what people *state* is of greatest importance is not a reliable method of identifying true customer priorities as manifested by actual buying behavior. In the context of the NQI Survey, a more robust method was to *derive* the relative importance of the seven characteristics by statistically modeling the relationship between users' attitudes toward the characteristics and their overall satisfaction with major highways. A respondent-level linear regression model was developed for this purpose.

The same three characteristics clearly emerge from this analysis as major priorities for highway improvement. But the top priority that resulted from this analysis is not "Safety," but "Pavement Conditions." Following are the results of the regression analysis. (The percentages identify the proportion of variance in Overall Satisfaction explained by each characteristic.)

Top 3 stated priorities for improvement:

- #1 Safety
- #2 Pavement conditions
- #3 Traffic Flow

More robust method of analysis: derived priorities

Top priority emerging from regression analysis: pavement conditions

- Pavement Conditions (31%)
- Safety (21%)
- Traffic Flow (19%)
- Bridge Conditions (10%)
- Visual Appeal (8%)
- Maintenance Response Time (7%)
- Travel Amenities (3%)

Top priority emerging from discriminant analysis: pavement conditions

As indicated earlier, an inordinate number of respondents indicated that they were “Neither Satisfied nor Dissatisfied” with the highway system. (That is, they responded with a “3” to the overall satisfaction question.) We developed a discriminant model that answered this question: Which characteristics would most cause these individuals to move their response from a “3” to a “4?” The same three characteristics emerge as the top priority items. But, again, “Pavement Conditions” is the characteristic that is clearly the highest priority item. Following are the results of this analysis:

- Pavement Conditions (36%)
- Safety (22%)
- Traffic Flow (16%)
- Visual Appeal (11%)
- Bridge Conditions (6%)
- Maintenance Response Time (6%)
- Travel Amenities (3%)

It is clear that the top priority for improving the nation's highways is to focus on the quality of the roadway surface. This is the factor that will most significantly increase public satisfaction with the highway system.

Survey also asked participants about funding issues

Public Support for Highway Improvement

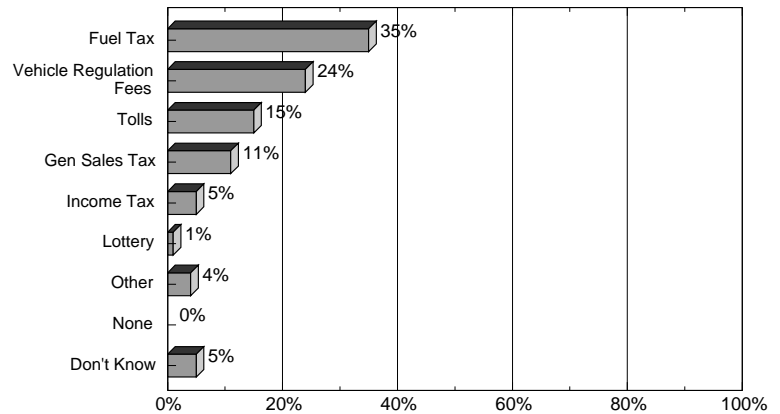
An additional dimension of assessing satisfaction with any product or service relates to customer opinions with regard to the cost, or perceived value, of that product or service. It was appropriate, therefore, to include in this survey some questions designed to measure the driving public's views of the current funding of the highway system. The following question was presented to each participant:

“Recognizing that highway improvements are funded by the general public, which one of the following revenue sources would you prefer to use for this funding?”

Following is a summary of the responses:

Fuel tax is the preferred source for funding highway improvements

Choice of Revenue Source



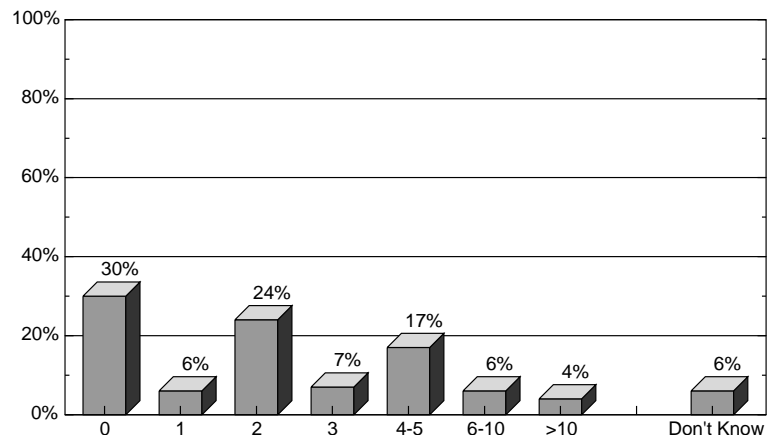
Participants were also presented with the following scenario:

"The current federal fuel tax is about 18 cents per gallon of fuel. How many more pennies would you be willing to pay per gallon of fuel to significantly improve (your priority highway characteristic.)"

The following chart reveals that 30% of the respondents indicated that they were not willing to pay any more in gas taxes to improve the highways; 64% indicated that they were willing to pay more; and 6% were undecided.

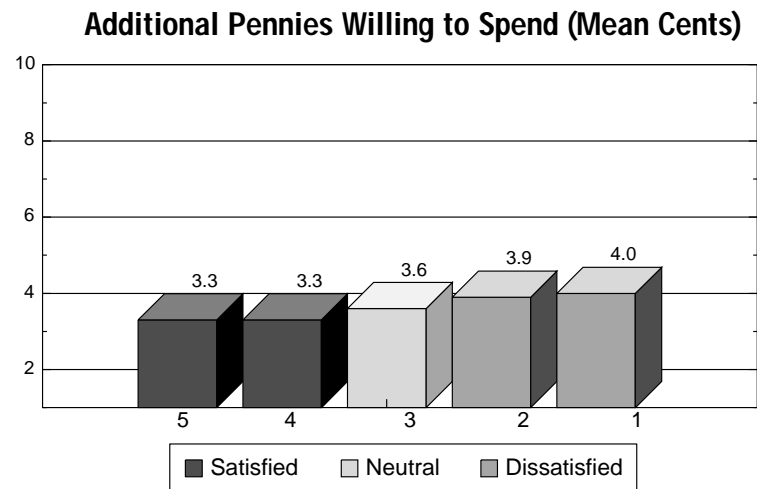
64% of the public indicate that they are willing to pay more in fuel taxes to improve the nation's highways

Additional Pennies Willing to Spend



It is also of interest to see if there is any difference in the amount respondents indicate they would pay for highway improvements in relation to their level of satisfaction with the highway system. The following chart indicates the *mean amount* (in terms of cents) that the public indicates they would pay, according to how they responded to the question, "Overall, how satisfied are you with the major highways you use."

The more dissatisfied customers of the highway system are willing to pay more for improvements



What is of interest is that, the more dissatisfied the respondent, the more they are willing to pay to improve the highways.

Additional Findings

The previous section identifies the major findings of the survey. But the survey results can be analyzed to yield a variety of information that reflects the varying levels of satisfaction and driving patterns of different segments of the population. The complete results of the survey are included in a detailed compendium of cross-tabulated data. These data enable an analyst to examine the wide range of relationships that exist between the different variables utilized in this survey.

This section of the report presents two additional findings that emerge from examining these data:

- Differences in driving patterns of the population
- Differences in satisfaction with the major characteristics of the highway system

Profile of Respondents: Differences in Driving Patterns

Following is a summary of the differences in driving patterns of the various segments of the population identified in the survey:

Age Differences

Those aged 55 and over:

- Drive more than the other age groups for purposes of shopping and errands and recreation
- Drive less than the other age groups for commuting and professional purposes

Regional Differences

Those who live in the South:

- Do more commuting to and from school or work
- Do less recreational driving

Those who live in the West:

- Do less driving on "Major two-lane" highways

Location of Driving

Those who drive in rural areas:

- Do more driving on "Major two-lane" highways

Those who drive in urban areas:

- Do more commuting to and from work and school
- Do less recreational driving

Residential Differences

Those who live in rural areas:

- Do less commuting to and from work or school
- Do more driving for shopping and errands
- Do less driving on the "Interstate" and "Other multi-lane" highways
- Do more driving on "Major two-lane" highways

Gender Differences

- Males do more driving on "Interstate" highways
- Females do more driving on "Major two-lane" highways

Characteristics of the Highway System: Public Differences

Following is a summary of the differing levels of satisfaction among the driving public with regard to the seven characteristics of the highway system measured in the survey. These findings might prove of value in supporting strategies for promoting highway improvement initiatives.

Traffic Flow

- Lower level of satisfaction for those who drive primarily on "Other Multi-lane" highways than those who drive primarily on "Interstate" and "Major two-lane" highways
- Higher levels of satisfaction for those who (1) live in rural areas, (2) drive in rural areas, (3) live in the North Central area of the country, and (4) are 55 years of age and over
- Higher level of satisfaction for those who drive cars than for those who drive vans or sport utility vehicles

Safety

- Lower levels of satisfaction (1) for female than for male drivers and (2) for those who live in the Northeast
- Higher level of satisfaction for those who drive primarily on "Interstate" highways than those who drive primarily on "Major two-lane" highways

Bridge Conditions

- Higher level of satisfaction for those who drive primarily on "Interstate" highways than for those who drive primarily on "Other multi-lane" and "Major two-lane" highways
- Lower level of satisfaction for those who live in the Northeast

Maintenance Response Time

- Higher level of satisfaction for those 55 years of age and older
- Higher level of satisfaction for those who drive primarily on

"Interstate" highways than for those who drive primarily on "Major two-lane" highways

- Lower levels of satisfaction for those who live in the Northeast than in the North Central and South

Visual Appeal

- Lower level of satisfaction among (1) those who drive primarily on "Other multi-lane" highways than for those who drive primarily on "Interstate" and "Major two-lane" highways and (2) those who drive in urban areas
- Lower level of satisfaction for those in the Northeast than those in the North Central and South

Travel Amenities

- Higher level of satisfaction among those who drive primarily on "Interstate" highways than for those who drive primarily on "Other multi-lane" and "Major two-lane" highways
- Lower level of satisfaction among those who live in the Northeast

Pavement Conditions

- Higher level of satisfaction for those who drive cars than for those who drive sport utility vehicles and trucks
- Those who live in the South have a higher level of satisfaction than those who live in the West and in the Northeast
- Those who live in the North Central region have a higher level of satisfaction than those who live in the West

Summary

The results of this survey should provide valuable support to those involved in promoting the continuous improvement of the nation's highway system. We have found that different segments of the driving public demonstrate varying levels of overall satisfaction with the highway system as well as with the discrete characteristics of the system measured in this survey.

The results also provide clear indications of the public priorities for highway improvement. These results can provide direction in targeting improvement initiatives.

There are additional ways in which these results might be of use within the highway community. The NQI Long-Range Strategic Plan anticipated using the survey results not just to provide direction in improving the highway system, but also to track customer satisfaction over time as a way to measure quality improvements. The results of this survey provide initial benchmarks against which changes can be measured in subsequent surveys.

In addition, states could sponsor customer measurement initiatives using the same methodology. They could then compare their populations' responses and priorities to the national norms. The results could be used to tailor specific improvement initiatives that reflect the views of their constituents.

The NQI is pleased to have sponsored this study. Our hope is that the results prove of value to all those involved in the planning, design, construction, maintenance and operations of our highway system.