

National Cooperative Highway Research Program (NCHRP)
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NCHRP Project 20-07/ Task 260

Putting Customer Research into Practice:
Guidelines for Conducting, Reporting, and Using
Customer Surveys Related to Highway Maintenance Operations

Volume 1: Final Report

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Putting Customer Research into Practice: *Guidelines for Conducting, Reporting, and Using* *Customer Surveys Related to Highway Maintenance Operations*

Requested by:

American Association of State Highway
and Transportation Officials (AASHTO)

Standing Committee on Highways

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1. Project Overview

Introduction

In the face of growing demand, tight budgets, and limited staff, State Highway Agency (SHA) maintenance organizations recognize the need to spend their maintenance dollars most effectively and specifically on those services and functions that are important to the customer. NCHRP Report 422, Maintenance Quality Assurance (MQA) Program Implementation Manual quotes former Executive Director of the Texas Department of Transportation Mr. Arnold W. Oliver in regards to SHA customers, “One way to give our customers quality is to know what they want” (NCHRP 1999). Though this observation was made ten years ago, it remains highly relevant and equally insightful today. To do this, SHAs need to know who their customers are and understand the roles maintenance operations play in satisfying their needs, expectations, and satisfaction regarding their state highways.

There are several research techniques for obtaining customer feedback. The most rigorous and scientific research method is a formal survey conducted by mail, telephone, in-person, and in some cases, online. These types of surveys yield the most reliable and representative customer data—the data is typically weighted and expanded to the entire population. Other research methods including focus groups, complaint cards or customer hotline conversations, can provide important qualitative data by offering details to help explain inconclusive or debatable data or hone-in on a surprising survey finding. Each research method has advantages and disadvantages and requires a range of resources and levels of expertise. SHAs vary similarly in their capacity to plan, develop, and administer surveys and need guidance in how to conduct high-quality customer surveys that result in data that is useful and actionable. That is, to be certain that survey data contributes to their maintenance program planning, feeds into their business plans, and helps to defend or justify operating budgets.

There is currently little documentation on any routine customer-related highway maintenance surveys being conducted by state agencies. The overall goal of NCHRP Project 20-07/Task 260 is to help SHA maintenance organizations conduct and use customer research by synthesizing and compiling illustrative examples of existing highway maintenance-related market research or customer research. Whether the goal is to build internal capacity and/or enlist external support to conduct customer research, this project will provide SHA maintenance organizations with:

- 1) Documentation of existing literature and current research practices at SHAs related to state highway maintenance programs and their efforts to collect customer feedback on their programs,
- 2) Case studies on how states are applying best practices in customer research interpreting, reporting (both internally with the DOT and externally as part of public outreach), and using the customer data, and
- 3) A set of guiding principles SHAs can follow once a decision has been made to pursue customer research.

With knowledge of the available resources, documentation of current practices and guidelines for conducting customer research, SHAs will become better prepared to defend the need for customer research (if it is not already being conducted), improve or enhance their capacity to conduct customer research that delivers actionable results, and increase the likelihood the research contributes to improved decision-making and operations.

Project Approach

Providing state agency maintenance organizations with information on how other states are integrating information from customer surveys into their highway maintenance operations required researching illustrative examples for SHA maintenance-related market research, customer survey activities, and related best practices. This was accomplished through three activities, outlined in Table 1.

Table 1: NCHRP 20-07/260 Project Activities and Outcomes

Project Task		Description	Outcome(s)
1	Literature Review	Collect and document customer surveys conducted by SHAs related to state highway maintenance programs	Annotated documentation of customer research including surveys and focus groups.
2	Broad Survey of SHAs ¹	Structured interviews with SHA practitioners on why, where, and when state highway maintenance programs conduct customer research.	Documentation of SHAs that are conducting routine customer research and using that data to drive decision making.
3	Case Studies	Investigations of the methods and uses of customer research, from a full life-cycle perspective, by SHA maintenance organizations.	Seven in-depth case studies.

While each activity has very specific steps and outcomes, two key tenets were considered in carrying them out:

- 1) Capture the full life-cycle² of a customer survey on a wide range of successful maintenance-related customer research project investment decision making, and
- 2) Capture illustrative examples of the best practices related to collecting, reporting, and using maintenance-related customer research.

Generally, the focus of these activities was on SHA maintenance organization's customer research efforts. The exception to this was in the literature review which captured existing guidance and documentation of best practices relating to customer research within transportation agencies. This included guidance on when to consider customer research for program development and planning, and how to design, administer, analyze and use customer research regardless of the service or product being delivered by an organization.

Important Considerations

This project resulted in a number of observations regarding the extent to which customer research is being practiced by SHA maintenance organizations and the challenges many face in doing so. One of those challenges is in their capacity to conduct the research. Some organizations have the expertise to conduct customer surveys in-house by drawing on dedicated research staff, but the majority relies on outside consultants, including Universities, to design and administer their surveys. In-house administration can be cost-effective and has the benefit of agency input into the design of the survey, and contracting a consultant can widen the scope of an organization's research capacity enabling more efficient survey administration or more rigorous design. While there are clear benefits to either means of administration, there are industry research standards to follow for conducting effective, high-quality customer surveys.

The information presented in this report does not provide a step-by-step set of instructions for meeting industry research standards nor does it offer detailed guidance on how to design and conduct a research study. This report does not "reinvent the wheel," but it does document the collection of and provides a compilation of information resources and customer research practices that are relevant to SHA maintenance organizations. This includes printed resources, such as guidance documents, on customer research that are relevant to SHA maintenance organizations and summaries of surveys and customer research practices conducted by SHA maintenance organizations. Providing SHAs with these resources, along with the set of guiding principles and supplemental tools for conducting customer research will help them build their capacity and their ability to conduct quality customer research and follow industry standards.

¹ The summaries of interviews with SHA maintenance organization practitioners included in this final report underwent a second round of reviews by interviewees prior to the drafting of this report. An appeal for copies of surveys and other information (cost of survey, copies of statement of work or requests for proposals) was also made from June through September, 2009.

² The life-cycle of a customer survey covers activities starting with the funding and Request for Proposal stage to survey execution to the reporting and use of customer input.

To illustrate the benefit of the information compiled in this report, the following represents highlights of the resources and practices that were uncovered in conducting this study that are exceptionally useful.

NCHRP 08-36, Task 74: Customer Research Practices and Applications: A Guidebook for Practitioners

The Guidebook is the product of an investigation into transportation customer research, which involved a literature review, a review of previous research, and telephone interviews with SHA's, a metropolitan planning organization, a toll authority, and a consultant. The Guidebook provides an overview of customer research, its benefits, and issues that can be addressed with customer research; provides examples of how transportation agencies have used customer research to drive decision making; explains the steps of the customer research effort; gives guidance on ensuring reliable results for statistically valid surveys; describes appropriate question wording and design; provides examples of how transportation agencies use the results of customer research; and discusses lessons learned and recommendations for transportation agencies that would like to conduct customer research or improve their current methods.

NCHRP Report 511: Guide for Customer-Driven Benchmarking of Maintenance Activities

This report provides guidance for state and local maintenance operation managers on assessing and enhancing agency performance through “customer-driven benchmarking.” Using the performances of other agencies as a means of gauging your own agency’s performance can help in uncovering best practices. Customer satisfaction, as measured by customer satisfaction surveys or other performance indicators, has become a key factor in performance measurement for state DOTs. The guide provides step-by-step instructions of the benchmarking process and establishing performance measures, describes the organizations involved and/or key players, and explains how to use those measures in determining agency performance and how to implement best practices.

NCHRP Report 487, Using Customer Needs to Drive Transportation Decisions.

This document offers rationale for soliciting customer input, guidance on how to define or segment a customer, and details on data gathering techniques including surveys, focus groups, etc. While the document provides a tremendous amount of information on transportation-related customer research, many of the best practices and a few of the case studies are related to maintenance operations.

2005 Customer Satisfaction Survey Best Practices Review, ETC Institute

This Findings Report conducted by ETC Institute for the Tennessee DOT details the processes and includes the instruments and reports of 10 customer satisfaction surveys conducted by state DOTs across the country. In reaching out to various state DOTs for comment on customer survey research, ETC focused on 1) survey instruments and the types of data they collect, 2) methods of analysis, 3) different customer groups that were surveyed, 4) barriers to the research process, and 5) how results of the surveys were communicated and to whom they were communicated. State DOTs included in the report: Colorado, Florida, Georgia, Indiana, Iowa, Kansas, Maine, Montana, Ohio, South Carolina, South Dakota, Texas, Virginia, and Wisconsin. This report also contains survey instruments utilized by these programs in conducting their customer research.

These resources broadly address customer research as it is practiced by the transportation industry. While their focus is not solely on maintenance operations, the resources provide many tangible, real-world applications SHAs can draw upon. Combined with the real-world examples of customer research conducted by and for maintenance organizations, these resources can serve as useful references for any SHA interested in conducting customer research.

For example, an important first step in planning a research study is identifying the target population that can best respond to the research questions. NCHRP Report 422 introduces the concept of defining

the survey population by first targeting the market of interest for a maintenance agency (“highway service”) and then by suggesting the ideal survey population as being “users of the highway facilities maintained by the agency.” It also recognizes that honing in on the target population (residents that use state highway facilities) can be challenging for those less experienced in research methods and offered two examples for defining a research target audience: “licensed drivers residing within the jurisdiction of the maintenance agency” and “motor vehicle registrants residing with the jurisdiction of the maintenance agency.” The interviews with state practitioners and a review of the surveys they have conducted illustrates that many have adapted a range of definitions for the purpose of screening and qualifying prospective respondents for surveys related to highway maintenance operations:

- ✓ A resident who travels at least 20 miles a week in motor vehicles on state highways (Louisiana DOTD)
- ✓ 18 years or older and has driven on a major highway within the last year (Kentucky DOT)
- ✓ Residents aged 18-69 years with a valid drivers license (Maryland SHA)
- ✓ Licensed drivers that drive at least 25 miles a week on state highways (Mississippi DOT)
- ✓ Residents, licensed or not, who use California highways (California DOT)

Selecting an appropriate mode for survey administration, including telephone, mail, or Web-based surveys can also be a struggle for some SHAs. Further, emerging issues related with their administration include the use of cell phone sampling for telephone surveys and our nation’s growing use of personal computers makes the consideration of Web surveys an attractive alternative to telephone or mail surveys. While guidance document NCHRP Report 08-36, Task 74 addresses the issues and tradeoffs of using these research methods, interviews with state practitioners indicate most states are relying on telephone and mail surveys and only a very few are using Web-based survey methods. In fact, those that are conducting Web-based surveys are doing so with varied success:

- Due to high cost issues related with conducting a telephone survey, California DOT (moved from a telephone to a Web-based survey administration in 2004, stating that the web survey is less costly to conduct (they do not require an outside contractor) and it reaches a wider audience, providing a larger sample size. But, the sampling approach does not use random sampling of the survey population but allows any interested and qualified respondent to opt-in or elect to participate on the survey. California also reports that managers do not consistently view the Web-based survey administration equal to the telephone survey in regards to providing scientifically executed and reliable data.
- Florida DOT (FDOT) conducted a web survey, but felt it did not yield the number of expected responses and, as such, was determined to be not as cost-effective as a telephone survey. FDOT now utilizes web-surveys in a mixed mode capacity—along with telephone and mail.
- Additionally, Minnesota DOT’s dedicated market research unit is only now preparing to implement the use of a Web-based community for customer research.

A final example of the usefulness of the resources compiled in this report is through providing examples of effective crafting of survey questions that hone-in on maintenance operations and services. Guidance documents and resources reviewed in this project recommended the industry standard of using focus groups and other qualitative approaches (e.g., interviews with employees, establish a steering committee, etc.) as part of the survey development process to review and provide feedback on question types and formats. This project provided examples of successful questionnaire development efforts using qualitative research in questionnaire development (e.g., Louisiana DOTD’s 2006 survey was pretested by customers).

Agencies are also using a range of question types and formats. While rating scale questions and rank-order or prioritization questions are used most frequently, several states are successfully applying questions related to funding priorities and the allocations of funds (e.g., “If you had \$400 to spend on the following areas, how much would you spend on each?” and “Would you be willing to pay more tax dollars if necessary to achieve your preferred level of highway maintenance?”). Creative questionnaire design contributes to successful and useful analysis, such as asking consistently structured “importance” and “satisfaction” questions on the same service area so that *top box* or *gap* analyses can be conducted.

These types of maintenance-focused examples are documented in an “item pool” or a list of survey questions that can be used by SHAs to customize their own surveys.

Report Organization

Chapter Two of this report documents the state of the practice of “putting customer research into practice” by SHAs and their maintenance operations. This chapter documents the results of the literature review and highlights particularly relevant literature for maintenance organizations, summarizes the range of customer research being conducted by SHA maintenance organizations, and presents the results of structured interviews that were conducted with 31 SHA maintenance organizations. Chapter Three presents the seven case studies that were prepared as a result of the research activities presented in the previous chapter. The case studies were developed by drawing primarily on interviews with persons responsible or knowledgeable about the program’s research efforts, but also from the literature review. Chapter Four presents a set of guiding principles for conducting research. It also introduces a compilation of resources, contained in Volume 2 of this report, to assist SHAs in putting customer research into practice. Finally, Chapter Five offers a set of final, broad observations regarding the state of practice of putting customer research into practice by SHA maintenance organizations.

2. State of the Practice

Conducting customer research and putting customer research into practice is not new to transportation agencies, in general. However, the extent to which it is being conducted and put into routine practice varies considerably across SHA maintenance organizations. For example, during the late 1990s, NCHRP developed guidance on establishing a Maintenance Quality Assurance (MQA) program that pointed to two critical opportunities for conducting customer research: at the onset of a program as input to the development of quality assurance measures and after the program was in place as an ongoing mechanism for obtaining customer feedback on satisfaction with maintenance operation products and services. Since that time, as MQA programs have developed and evolved, a few states have been very active in customer research. Other SHAs have conducted a one-time survey and never got around to another, while others are only just getting started.

Guidance for conducting and applying customer research also exists in many forms, most notable again as NCHRP reports, and many of these reports document the practices of many states in conducting customer research. Still, few SHAs appear to be aware of these resources.

This chapter presents the state of the practice of conducting and applying customer research by SHA maintenance organizations. It documents the results of the literature review of information sources relating to conducting customer research by highlighting resources of high relevance to this project and compiling a database of customer surveys that have been conducted by SHAs related to maintenance operations over the past ten years. It also summarizes the results of interviews conducted with 31 SHA maintenance organizations on their customer research efforts. Finally, the key findings are summarized at the end of this chapter.

Literature Review

As an important first step and to establish a foundation for this project, a comprehensive search for information on the practice of collecting customer input on highway maintenance programs was conducted. The objective of this fact-finding and exploratory research was two-fold:

- 1) Identify existing guidelines, guidance, and resources that serve as the impetus for SHAs to consider customer input in the first place and then provide practical advice on carrying out customer research and incorporating research findings back into their maintenance operations programs, and
- 2) Collect and document customer surveys conducted by SHAs related to state highway maintenance programs.

This search consisted primarily of online queries of the Transportation Research Information Service (TRIS Online); National Technical Information Service (NTIS); searches of CD-ROMs with papers presented at the annual meetings of the Transportation Research Board (TRB) CD-ROMs; and the MQA Resources Website to identify articles, reports, and media accounts of citizen or customer surveys conducted by SHAs. Other references, including Report 487: Using Customer Needs to Drive Customer Decisions and Project 08-36/Task 74: Customer Research practices and Application in Transportation, were also used as initial resources to identify the sources of information.

The following subjects were targeted, in various combinations, in the literature search:

- Customer survey
- Customer satisfaction
- Customer satisfaction survey
- Customer input
- Public opinion

- Maintenance customer survey
- Highway maintenance
- State highway maintenance
- Maintenance Quality Assurance and MQA

Each document obtained for use in this study was carefully reviewed. Some references contained considerable valuable and relevant information to the project work, whereas many other references contained little or no pertinent information. In this section, the materials containing information that is relevant to this project are presented in two categories:

- 1) Non-Survey Resources – These documents offered information on a number of topics dealing with the rationale and guidance for conducting customer research as input for SHA maintenance program planning and using customer input as a tool to monitor program performance. Many of these resources also referenced customer surveys conducted by SHAs.
- 2) Customer Surveys – These resources comprise reports documenting customer survey efforts that were conducted by SHAs. Short summaries, or annotations, of most of the reports we obtained and reviewed are included in Appendix A.

Non-Survey Resources

While the overall intent of the literature review was to collect and document maintenance program-related customer surveys conducted by SHAs over the past ten years, this search extended to the past twenty years. Going back further provided relevant context and background for this project. Table 2 below identifies the most insightful non-survey resources collected and reviewed as part of this literature review. Many of the documents contributed to the identification of the surveys summarized in this chapter.

Table 2: Non-Survey Reports, Documents, and Articles Reviewed

Date	Title and Citation	Authors
1989	Indicators of Quality in Maintenance, NCHRP 148	C.R. Miller
1997	Highway Maintenance Quality Assurance	K.L. Smith, M.L. Stivers, T.E. Hoemer, A.R. Romine
1999	Maintenance QA Program Implementation Manual	M.L. Stivers, K.L. Smith, T.E. Hoemer, A.R. Romine
2001	Public Perceptions of Midwest's Pavements: Explaining the Relationship Between Pavement Quality and Driver Satisfaction, Transportation Research Record 1760, Paper No. 01-0384	James K. Giese, Robert J. Griffin, and David A. Kuemmel
2001	Managing Change in State Departments of Transportation. Scan 3 of 8: Innovations in Institutionalization of Operations NCHRP Web Document 39	Philip J. Tarnoff
2002	Intensive Customer Feedback to Improve Delivery of Highway Maintenance Programs in Pennsylvania; Transportation Research Record 1812, Paper No. 02-2441	Theodore H. Poister, Richard H. Harris, Joseph Robinson, Jill S. Reeder
2003	Acceptability of Pavement Roughness on Urban Highways by Driving Public, Transportation Research Record 1860, Paper No. 03-4430	Kevan Shafizadeh and Fred Mannering
2003	Using Customer Needs to Drive Transportation Decisions, NCHRP Report 487	Kathleen E. Stein, Robert K. Sloane
2003	So We're a 7, But What does that Tell Me? Collecting and Analyzing Relevant Customer Data, Transportation Research Circular Number E-C052	Matthew Dull and Alison S. Lebwohl
2004	Public Benefits of Highway System Preservation and Maintenance, NCHRP Synthesis 330	Andrew C. Lemer

Date	Title and Citation	Authors
2004	Guide for Customer-Driven Benchmarking of Maintenance Activities, NCHRP Report 511	W. Hyman
2004	Does Quality Management Work in the Public Sector, Public Administration and Management: An Interactive Journal 9 (3)	Shand H. Stringham
2005	Developing Roadway Standards for Ride Quality from the Customer's Perspective	Poister, Garvey, Zineddin, Pietrucha and Smith
2005	2005 Customer Satisfaction Survey Best Practices Review	ETC Institute for the Tennessee Department of Transportation
2005	Linking Asset Management to Strategic Planning Processes, Best Practices from State Departments of Transportation, Transportation Research Record	Anthony M. Pagano, Sue McNeil, and Elizabeth Ogard
2006	The Use of Highway Maintenance Management Systems in State Highway Agencies, Survey of Maintenance Management Systems	Applied Pavement Technology, Inc.
2007	Customer Research Practices and Applications: A Guidebook for Practitioners, Final Report, NCHRP 08-36 Task 74	Kelly Klaver Pecheux with Laura Feast and Sheryl Miller
2008	A Study on Road Users' Overall Perceptions of Highway Maintenance Service Quality and the Variables that Define the Highway Maintenance Service Quality Domain	Adrian Burde

Customer Survey Documentation

Since the late 1990s, SHAs have increasingly placed resources into bringing the customer voice into the decision-making process for planning and monitoring performance of highway maintenance services. Despite there being a number of resources and guidance documents on why and how to conduct customer research for maintenance program and operations planning, the practice is varied. Two very general observations about SHA maintenance organization customer survey efforts that were drawn from a review of the surveys that have been conducted in recent years are:

- SHAs conduct customer research for clear and distinct purposes: *to inform* the development of performance or level of service (LOS) measures often as part of their MQA Program or *to monitor* customer satisfaction with maintenance services.
- Some SHA maintenance organizations conduct surveys that focus *only* on maintenance services and programs while others rely on *agency-wide* or *“omnibus”* customer surveys, which contain just a few questions related to maintenance services and programs.

Table 3 documents many of the surveys that were referenced in the non-survey sources or were located through other searches, or obtained following discussions with SHA maintenance organization practitioners about their customer survey experiences. The data in the table are presented alphabetically by state and chronologically within each state if more than one survey was reviewed.

Table 3: Customer Surveys Reviewed

State	Customer Research						
	Research Title	Year	Sample Size	Margin of Error	Stratification	Target Population	Mode
AZ	Arizona Quality Initiative Survey of Highway Users and Community Leaders	1997	2,035	+/- 5%	5 geographic subareas: (1) Metro Phoenix, (2) Metro Tucson, (3) Coconino County, (4) Yuma County, (5) Remainder of the state	AZ residents 18 years of age and older	Phone
			200	+/- 5%	5 geographic subareas: (1) Metro Phoenix, (2) Metro Tucson, (3) Coconino County, (4) Yuma County, (5) Remainder of the state	AZ Community Leaders (local government officials, elected representatives, business leaders, community activists, and lobbyists)	Phone
	Arizona Highway Maintenance Survey	2001	406	+/- 5%	4 districts, as selected by Dye Management, reflecting various terrain and climate condition affecting highway maintenance: (1) Rural – Snow and Ice, (2) Rural – High temperature, (3) Urban, and (4) Rural – High elevation	AZ residents who drive at least 50 miles per week in a motor vehicle on state highways	Phone
	Customer-Oriented Level of Service Maintenance Management System	2005	403	N/A	4 regions: (1) Urban (101), (2) Rural – High Temperature (100), (3) Rural – Snow and Ice (100), and (4) Rural – High Elevation (102)	AZ Residents	Phone
			unknown		3 areas: (1) Phoenix, (2) Tucson, and (3) Flagstaff	AZ Residents	Focus Group
			92		Regions throughout the state (regions and number of groups not available)	ADOT Maintenance staff	Focus Group
113			N/A		AZ Residents (Supplemental Survey)	3-step Interviewing process	
CA	2001 Survey of Licensed California Drivers Regarding Highway Maintenance Activities	2001 (Survey also conducted in 1996 and 1998)	3,300	+/- 4%	8 geographic regions: (1) Eastern CA, (2) North Valley, (3) Sacramento, (4) San Joaquin Valley, (5) Bay Area, (6) Coast, (7) LA Basin, and (8) San Diego	CA Registered drivers	Phone
	2005 Maintenance Customer Survey	2005	12,000	+/- 1%	12 districts (by region)	CA Residents, licensed drivers or not, who use CA highways	Web
FL	Customer Satisfaction Survey (The first CSS was conducted in 2000, and is conducted	2002	476	+/- 5%	6 customer segments: (1) Residential travelers, (2) Commercial (2000 Survey only), (3) Elected/Government	Government officials	Mail
			396	+/- 5%		Well-Elders	Mail
			1,750	+/- 2.4%		FL Residents	Phone

State	Customer Research						
	Research Title	Year	Sample Size	Margin of Error	Stratification	Target Population	Mode
	biennially.)		448	+/- 4.7%	officials, (4) Well elders, (5) Transportation disadvantaged clients (2000 Survey only), and (6) Visitors to FL; 3 areas: (1) urban, (2) rural, and (3) transitioning	Visitors to FL	Phone (Web for surveys conducted in later years)
IN	Customer Survey	2001	590	+/- 5%	550 respondents from 10 Bureau of Motor Vehicle locations, and 40 respondents from 2 Interstate rest stops	IN Motorists	Survey forms were left on site, then collected after 1 month (from BMV) or 2 weeks (from rest stops)
KA	2000 External Customer Survey	2000	1,848	+/- 2.2%	N/A	KA Residents	Phone
	2007 Statewide Customer Satisfaction Survey	2007 (Survey also conducted in 1997, 2000, and 2003)	947	+/- 3.2%	6 Districts (150 completes per district)	KA Residents	Phone
	2007 KDOT Post Construction Survey	2007	374	+/- 5.2%	3 Areas (of improvement): (1) Highway K-7, (2) Highway K-27, and (3) US-54	KA Residents who live near areas that received highway improvements	Mail
			54		N/A	Stakeholders	N/A
KY	Annual Assessment of Customer Satisfaction and Needs	1997	657	+/- 3.82%	N/A	KY Residents who are licensed drivers over 18, and had to have driven on a major highway within the past year (major highway defined as: (1) the interstate highway system, (2) other multi-lane highways such as expressways, freeways, toll roads, and (3) major two-lane highways, i.e., any numbered highways with 3 or less digits	Phone

State	Customer Research						
	Research Title	Year	Sample Size	Margin of Error	Stratification	Target Population	Mode
LA	DOTD Customer Satisfaction Survey	2003	1,600	+/- 2.5%	4 geographic areas based on parish of residence: (1) Southeast LA (2) Florida-River Parishes (3) Acadiana-Southwest, and (4) North LA	LA Registered voters who hold a valid driver's license and have driven on the state highway system within the past year	Phone
	Business Process Improvement Program	2006	401	+/- 5%	9 Regions, developed to reflect the different types of terrain and climatological conditions that might affect highway maintenance	LA highway users who drive at least 20 miles per week in a motor vehicle on LA highways	Phone
			18	+/- 5%	2 groups, 1 in either location: (1) Baton Rouge and (2) Natchitoches—chosen for geographical and rural/urban balance	LA Residents within 50 miles of the focus group site, and who drove at least 20 miles weekly on LA highways	2 Focus Groups
			8	+/- 5%	Participants were selected by DOTD Customer Satisfaction task team at the request of Dye Management Group	DOTD Employees	1 Focus Group
MD	Customer Satisfaction Survey	2006	2,462	+/- 2%	7 State Highway Administration (SHA) districts (380 respondents per district)	MD Residents with valid driver's license, between the ages of 18-69	Phone
	Customer Satisfaction Survey	2008	2,333	+/- 2%	7 State Highway Administration (SHA) districts (380 respondents per district)	MD Residents with valid driver's license, between the ages of 18-99	Phone
MI	Painted Rumble Strips on Michigan Freeways: Driver and Community Perceptions	2005	1,530	+/- 3.5%	5 groups (by county and population): (1) Oceana and Muskegon Counties, (2) Montcalm and Mecosta Counties, (3) Ionia County, (4) Ottawa County, and (5) Kent County	MI Residents living within two miles of the freeways containing the new rumble strips	Mail
			33	+/- 3.5%	4 groups of commercial fleet drivers: (1) Fleet transport truck driver for major companies, (2) Regional delivery trucks, (3) Local public safety agencies, and (4) Bus drivers	Frequent users of the freeways	Focus Group
MO	Transportation Customer Survey	2003	4,102	+/- 3.0%	10 MoDOT districts (geographic)	MO Residents over 18	Phone

State	Customer Research						
	Research Title	Year	Sample Size	Margin of Error	Stratification	Target Population	Mode
MT	Perceptions of Highway Maintenance in Montana in 2008	2008 (First survey was conducted in 1996 and is now conducted biennially)	1,000	+/- 5%	N/A	MT Residents over 18	Phone
ND	North Dakota Department of Transportation 2008 Customer Satisfaction Survey	2008 (Survey also conducted in 2004 and 2006)	600	+/- 4%	N/A	Motorists	Phone
			220	+/- 4.75%		Motor carriers	
			115	+/- 4%		Government officials	
			86	+/- 9%		ND Businesses	
NE	Nebraska Resident Satisfaction Survey Results	2008 (Survey also conducted in 1997, 2001, and 2004)	1,811	+/- 2.3%	8 districts	NE Residents, NDOR customers	Phone
SC	Highway Maintenance Survey	2004	3,649	+/-1.7%	7 districts	SC Residents who are over 18 and drive	Mail
SD	SDDOT 1999 Customer Satisfaction Assessment	1999	unknown	NA	6 focus groups in 3 of the 4 SDDOT regions: (1) 2 groups in the Mitchell Region, (2) 2 groups in the Pierre region, and (3) 2 groups in the Rapid City region	SD Residents	Focus Group
			734	+/- 3.7%	N/A	SD Residents	Phone
			66	+/- 12.3%		Legislators	Phone
	SDDOT 2002 Statewide Customer Survey	2002 (Survey also conducted in 1997 and 1999)	119	+/- 9.2%	10 sessions in 4 transportation regions: (1) Aberdeen, (2) Rapid City, (3) Pierre, and (4) Sioux Falls 6 customer segments (all	SD Residents	10 Focus Groups
			1,121	+/- 3.0%		SD Residents for 6 months or more	Phone

State	Customer Research						
	Research Title	Year	Sample Size	Margin of Error	Stratification	Target Population	Mode
			60	+/- 12.9%	18+ years of age: (1) Citizens (people who have lived in SD at least 6 months), (2) Leisure travelers (those who have traveled by car 75+ miles from home on a leisure trip and stayed at least on night away from home), (3) Farmers (for those whom agriculture has been their primary occupation for 1(+) year and currently active in agriculture, (4) Emergency vehicle operators (currently drive and have driven an emergency vehicle for 6+ months), (5) Carriers/Shippers, and (6) Legislators (60 total—and who participated in the 1999 Survey)	Legislators	Phone
	SDDOT 2006 Statewide Customer Satisfaction Assessment	2006 (Survey also conducted in 2004)	859	+/- 3.4%	5 customer segments: (1) senior citizens (356), (2) truckers/shippers (145), (3) emergency vehicle operators (101), (4) farmers/ranchers (215), and (5) contractors (42)	Stakeholders	Web
			1,004	+/- 3.1%	4 SDDOT regions	SD Residents	Phone
			unknown	N/A	6 North Central states	Residents of ND, MN, IA, NE, WY, and MT	Phone
			unknown		Contractors who do business with SDDOT	SD Contractors	Web
TN	2006 Statewide Customer Satisfaction Survey	2006	2,036	+/- 2.3%	4 TDOT regions	TN Residents	Mail, Phone
			208	+/- 2.3%	3 levels of government: (1) city mayors (138), (2) county mayors (36), and (3) state legislators (34)	Elected officials	Phone
			400	+/- 2.3%	N/A	Residents in 8 surrounding states (NC, VA, KY, MO, AK, MS, AL, and GA)	Phone
VA	Dashboard Customer Satisfaction Survey	Survey conducted biannually, since 2006	1,800	+/- 2.4%	9 districts	VA Residents	Phone
WA	2000 Maintenance Customer Survey	2001	632	+/- 4%	3 geographic regions: (1) Western non-urban, (2) Eastern, and (3) Western urban	WA Residents who drive 50 miles or more a week on state highways	Phone
	2005 Maintenance Customer Survey	2005	802	+/- 3.5%	3 geographic regions: (1) Western non-urban, (2) Eastern, and (3) Western urban	WA Residents who drive 50 miles or more a week on state highways	Phone

State	Customer Research						
	Research Title	Year	Sample Size	Margin of Error	Stratification	Target Population	Mode
WI	WisDOT Customer Satisfaction Survey Results	2004 (Survey also conducted in 1996, 1997, and 1999)	2,030	+/- 2.1%	6 customer groups: (1) DMV in person, (2) DMV by phone, mail, or online, (3) Traffic and Road Construction (encountered road construction or major maintenance project on WI state highway), (4) State Highway Operations (have driven on WI state highway, but had no other recent interactions with WisDOT), (5) State Patrol (was stopped for a traffic violation by the WI State Patrol), and (6) People Impacted by Highway Construction (property, town, or neighborhood affected by construction or expansion of a state highway or interstate)	WI Residents	Phone, In person, Mail, Web
WY	WYDOT Customer Satisfaction Survey 2008	2008 (Survey also conducted in 2002, 2004, and 2006)	1,265	+/- 2.8%	23 counties (50 completed surveys from each county)	WY Residents who are at least 18	Phone
	WYDOT Statewide Customer Satisfaction Survey	2002 (Survey also conducted in 1996)	1,542	+/- 2.5%	Disproportionate by county	WY households with telephones	Phone

Survey of State Practitioners

A broad survey of state DOT practitioners was conducted to gather information about why, where, and when state SHAs collect customer surveys for maintenance operations; to identify and document the customer-focused performance measures that are commonly used to drive business decisions; and to identify strategies used by SHAs to report and use the data. In all, 32 interviews were conducted with state DOT practitioners from 31 different states. This section summarizes these interviews.

As a precursor activity to the broad survey, NuStats attended the MQA Peer Exchange in Raleigh-Durham (NC) in September 2008 and conducted about twelve in-depth interviews with state DOT leaders in the area of executing and using customer surveys in highway maintenance operations. A summary of the structured interview effort was presented and reviewed with the NCHRP 20-07 Project Panel at the conclusion of the Peer Exchange. During this meeting, NuStats recommended conducting the remaining of the state surveys as structured interviews, because of the quality of the information collected, and recommended a number of refinements to the interview instrument. The Project Panel approved the recommendations.

Following the Peer Exchange, using a list of MQA Program contacts provided by the Project Panel as the sample frame, NuStats contacted each contact by telephone to request and arrange telephone interviews with them or a person designated as an appropriate and knowledgeable alternative. Several contacts requested to complete the survey in lieu of the telephone interview; three surveys were completed in this format. Interviews were conducted from September 23, 2008 through February 10, 2009. Delays in conducting interviews were largely due to the inability to reach the contacts by phone (follow up e-mails were also sent in such cases) requiring multiple call-backs, the November and December holiday schedule, and the need to reschedule appointments.

In regards to the content of the interview, each interviewee was asked to describe any and/or all surveys that their state DOT conducts, how often they are conducted, and what the survey aims to measure, with an explicit focus on maintenance operations. If the surveys they described were characterized as being 1) a measure of their organization's overall performance and contained one or more question on maintenance or, more specifically, 2) a measure of customer satisfaction on maintenance operations alone, then further questions were asked pertaining to these types of surveys.

Further questions probed for answers regarding who is surveyed, the reasons for the survey, those involved in developing the survey, the ways in which the organization uses the data gathered from the surveys, whether the surveys are conducted in-house or by a consultant research team, and if the data has any impact on decision making related to the allocation of funds.

The interview also covered maintenance operations quality assurance programs and performance measures related to maintenance operations, and, in both cases, if and how they require customer input or statistics; the specific maintenance operations that could be covered in a customer survey (e.g., bridges condition, pavement/roadway condition, drainage, traffic, control); which of these measures are the most important for a customer survey about maintenance operations; why these measures are important; which are the least important; and whether benchmarking customer input on their organization is important.

Table 4 lists, by state, each participating organization and the date of each interview. Following the table are brief summaries for each interview. Appendix B contains a copy of the interview instrument. For future reference, contact information for the persons interviewed or the person most knowledgeable about the SHA's maintenance customer research is included in Volume 2 of this report.

Table 4: List of Interviewees

State	Organization	Date of Interview
AR	Arkansas State Highway and Transportation Department	November 12, 2008
AZ	Arizona Department of Transportation	November 6, 2008
CA	California Department of Transportation	November 13, 2008
CT	Connecticut Department of Transportation	September 23–24, 2008
FL	Florida Department of Transportation	February 5, 2009
GA	Georgia Department of Transportation	September 23–24, 2008
HI	Hawaii Department of Transportation	November 17, 2008
IA	Iowa Department of Transportation	November 13, 2008
ID	Idaho Department of Transportation	December 1, 2008
IL	Illinois Department of Transportation	November 10, 2008
IN	Indiana Department of Transportation	September 23, 2008
KA	Kansas Department of Transportation	September 23–24, 2008
KY	Kentucky Transportation Cabinet	September 23–24, 2008
LA	Louisiana Department of Transportations and Development	November 6, 2008
MD	Maryland Department of Transportation State Highway Administration	September 23–24, 2008
MI	Michigan Department of Transportation	September 23–24, 2008
MO	Missouri Department of Transportation	November 12, 2008
MS	Mississippi Department of Transportation	November 10, 2008
MT	Montana Department of Transportation	February 10, 2009

State	Organization	Date of Interview
NC	North Carolina Department of Transportation	November 6, 2008
ND	North Dakota Department of Transportation	December 15, 2008
NE	Nebraska Department of Transportation	November 6, 2008
OR	Oregon Department of Transportation	December 4, 2008
SC	South Carolina Department of Transportation	September 23–24, 2008
TN	Tennessee Department of Transportation	November 13, 2008
TN	Tennessee Department of Transportation	November 7, 2008
VA	Virginia Department of Transportation	September 16, 2008
WA	Washington State Department of Transportation	November 6, 2008
WI	Wisconsin Department of Transportation	January 22, 2009
WY	Wyoming Department of Transportation	September 23–24, 2008

Interview Summaries

State: Arkansas (AR)
Organization: Arkansas State Highway and Transportation Department
Interviewee: Scott Bennett, Asst. Chief Engineer for Planning
Date: November 12, 2008

The Arkansas State Highway and Transportation Department conducts surveys on the highway condition but does not collect the opinions of its customers.

They do employ a Maintenance Management System (MMS), which alerts them to what maintenance operations are needed—line stripping, signage, pothole repair, pavement conditions. The MMS updates Arkansas DOT on the progress of these operations and the timeline for completion, and assists with budget management.

They do not have performance measures and, as a result, do not collect customer input or statistics

for these measures. Arkansas DOT understands where the highway maintenance needs are. Collecting consumer feedback only reinforces their assumptions and, in some cases, compounds them, which is not always helpful. Arkansas DOT incorporates a pavement management system that collects data electronically directly from the road by measuring ruts, pot holes, identifying cracking etc., which provides an assessment of pavement condition on the highway. The data collected through the pavement management system helps them predict when maintenance is needed, which assists with creating and allocating budgets.

State: California (CA)
Organization: California Department of Transportation
Interviewee: Steve Takigawa, Chief, Maintenance Division
Date: November 13, 2008

The California Department of Transportation (DOT) has collected customer data focused on maintenance operations since 1996 through four separate surveys: Survey of Licensed Drivers ('96), Highway Maintenance Activities ('98, '01), and Highway Maintenance Customer Survey ('04-'05). California DOT was motivated to collect public opinion on maintenance operations (as a supplement to the physical data being collected) in order to determine how the public perceived the DOT's efforts and to determine what changes need to be considered in order to serve the public more efficiently. Each survey was designed by a California DOT employee who conducted preliminary research within the agency to assure the survey instrument was up-to-date and designed to capture all pertinent data. The survey was also administered in-house but with the assistance of a consultant who managed data collection. The California DOT used the data to reallocate resources to areas (both of activity and by geographical area) where there was an apparent need for improvement.

The surveys validated the agency's belief that the public's priorities were the same—Safety, Preservation, and Service. Certain safety areas that were identified were given special focus in the department's strategic plan. The survey administrators preferred the Internet methodology because they were able to reach a wider audience (12,000 respondents) versus the telephone methodology (1,000 respondents) for a similar price.

Within the California Department of Transportation, the maintenance operations quality assurance program primarily consists of the Level of Service Program. In the past, performance measures related to maintenance operations required customer input, but due to costs and the staleness of the data, such efforts have been suspended. Customer input is currently collected through a Web-based complaint system. Managers continue to be receptive to consumer feedback but are skeptical of new technology that varies from the traditional telephone or focus group methodology.

State: Connecticut (CT)
Organization: Connecticut Department of Transportation
Interviewee: Alan White and Aaron Steves
Date: September 23–24, 2008

Connecticut Department of Transportation (CDOT) does not conduct customer surveys; rather, their customer input is complaint-driven. CDOT is currently building a maintenance operations quality assurance program. CDOT's maintenance management system has internal measures that are termed "accomplishments," to which CDOT applies standards for each. CDOT chooses to rely on

the customer complaint system, as opposed to conducting a customer survey. If they were to conduct a survey, trust in an agency's ability to maintain highways would be an important measure for CDOT. Having never conducted a customer survey, CDOT would like to see guidelines addressing funding, budget, which organizations conduct surveys, and reasons for such a survey.

State: Florida (FL)
Organization: Florida Department of Transportation
Interviewee: Tim Lattner, P.E., Director, Office of Maintenance
Date: February 5, 2009

The Florida Department of Transportation (DOT) has engaged the customer through qualitative and quantitative research since 1999 in order to better provide services, in particular highway maintenance for the public. Beginning in 1999, after adopting the Sterling initiative to reach out to transportation system customers, Florida DOT conducted a series of focus groups with Florida residents. The information gathered was used to construct the initial questionnaire for their first customer satisfaction survey, administered in 2000, which focused on all aspects of transportation, including highway maintenance. The Florida DOT partnered with the University of Florida and the Florida State University, who managed

data collection and provided the Department with a summary report of the data. Through the years, the customer satisfaction surveys have been administered to Florida residents and other FDOT customer segments using a variety of methodology, including Telephone, Mail, and Online. The data provided by the surveys are used to implement improvements within the department. Each FDOT district has a customer satisfaction champion who is actively involved in identifying issues of concern and making recommendations on strategies for improvement to the Executive Board. Based on the recommendations presented, the Executive Board allocates resources—staff, budget, etc.—accordingly.

State: Georgia (GA)
Organization: Georgia Department of Transportation
Interviewee: Eric Pitts, Assistant State Maintenance Engineer
Date: September 23–24, 2008

Georgia Department of Transportation (GDOT) has conducted only one survey in recent years—a Permitting Unit Customer Survey; they have not conducted customer surveys on maintenance operations. GDOT's maintenance operations quality assurance program is restricted to pavement conditions and road systems, which are rated annually through the MQA program. This program does not require that customer opinions be collected or measured. While GDOT may have reasons to conduct a customer survey on maintenance operations, there has been no push from staff to do so.

One measure GDOT would not include in a customer survey is the ranking of maintenance operations in order of importance; GDOT explains that the public does not understand all

of the issues in order to rank importance. While litter may be important to the public, as a beautification measure, it is less important than safety-related measures. However, GDOT would like to measure public satisfaction with specific maintenance operations areas, and the impact of maintenance on customer travel time and delays. Public perceptions about the conditions of bridges, roadways, pavement, etc. would be interesting to know but not to evaluate the performance of Maintenance Operations as public perception is not based on engineering concepts. Furthermore, GDOT would like to see guidelines for putting the results of customer surveys to use and getting practitioners to see the benefit of using customer information.

State: Hawaii (HI)
Organization: Hawaii Department of Transportation
Interviewee: John Williams, Maintenance Engineer
Date: November 17, 2008

The Hawaii Department of Transportation (DOT) does not currently conduct customer surveys at all, nor do they have an official maintenance quality and assurance program. However, there are quality assurance procedures for bridge inspections and, on occasion, for specific projects. Customer input is not used for measuring maintenance performance. They only address customer complaints collected through each District office.

Hawaii DOT's Executives have not considered conducting customer surveys on maintenance operations for three reasons. First, they believe they know what people are mostly concerned about—potholes. Second, Hawaii is a small state with limited resources; they have neither the staff to administer such a survey nor the money to hire a consultant. .

State: Iowa (IA)
Organization: Iowa Department of Transportation
Interviewee: Ron Bean, Performance Measurement Manager
Date: November 13, 2008

In 2002, the Iowa Department of Transportation (DOT) conducted a Maintenance Customer Survey focused on winter services, and in 2006 conducted a General Maintenance Customer Survey. Both surveys specifically measured customer satisfaction on maintenance operations. Iowa DOT has been collecting performance measurement data each year since 2000. In 2002 they believed collecting input from the public would be helpful when added to the physical maintenance performance measurements being collected. Iowa DOT saw collecting winter services data as the obvious first step since they are the most visible services for drivers. Iowa DOT designed both surveys internally with input from each maintenance division, and a technical lead for survey design. For the general survey, a more diverse planning team was assembled.

The planning team researched methodologies used by Minnesota and Wisconsin by looking at the state DOT websites. The survey sample included 5,000 randomly selected licensed drivers stratified by age and gender. Data collection was also managed in house. After all data was collected, an employee who was experienced in survey research assumed the role of technical lead for the summary report. Upon completion, the summary report was reviewed by the original planning team, with the final report being presented to the Highway Division's management team. Both surveys were set on a scale of Importance vs. Performance, allowing Iowa DOT to do a "gap analysis" and to identify items that were of high importance, but for which Iowa DOT was not fully meeting driver expectations.

State: Idaho (ID)
Organization: Idaho Department of Transportation
Interviewee: Steve Spoor, Operations and Development Engineer for Maintenance
Date: December 1, 2008

The Idaho Department of Transportation (DOT) has not conducted consumer surveys at all, including for highway maintenance. However, they do collect MQA measures by measuring specific maintenance criteria on randomly selected sections of roadway. This process does not include customer input or statistics.

Engineers at Idaho DOT believe they are roughly three years away from developing their

Maintenance Management System, which may require input from customer. Currently, Executives would be receptive to the idea of conducting a customer survey on maintenance, but costs are a major deterrent. In general, the maintenance operations program is not a high priority within the department.

State: Illinois (IL)
Organization: Illinois Department of Transportation
Interviewee: Joe Hill, Engineer of Operations–Division of Highways
Date: November 10, 2008

The Division of Highways within the Illinois Department of Transportation collects customer feedback for its maintenance operations through an annual survey called the “Motorist Opinion Survey.” Since 2002, the Illinois Department of Transportation has conducted this survey in order to collect feedback from motorists. This work is executed by a contractor through the University of Illinois. Survey content includes subjects such as snow removal, road repair, litter pick-up, pavement marking, signage, etc. Motorists are reached by mail, and for the 2007 effort, the Illinois Department of Transportation

delivered 2,500 mail-out forms. Response rates typically range between 50% and 60%. Each year the University of Illinois manages survey design and data collection, and then presents the findings to the Illinois Department of Transportation through a summary report of data that has been analyzed by graduate students. The results from the survey and feedback included in the report are used by government staff as a balanced score card for establishing budgets for all its state agencies, including maintenance operations.

State: Indiana (IN)
Organization: Indiana Department of Transportation
Interviewee: Krystal Cornett, Highway Management/Maintenance Administrator
Joseph Bruno, Highway Engineer
Date: September 23, 2008

In Spring 2001, highway operations contracted with Bob McCollough at Purdue University to conduct a customer survey. The survey specifically measured customer satisfaction on maintenance operations. The survey was conducted to identify priorities as viewed by the public (snow and ice removal were top priority). The survey was based on work done by Florida DOT, and then customized to INDOT’s needs. Motorists at rest stops were surveyed. The survey was used specifically by the Highway Operations Division; it was an internal program activity. Based on the survey, a winter operations team was established. The survey results were not used to determine funding allocations across the agency. There was no CEO (Executive) or legislative connection to the survey results; therefore, it had no impact on any other

element of the organization—on budgets or funding decisions. There was the sense that upper management did not care to continue to get public input, so the survey was not repeated. There is not currently a customer focus at the Department; there could be if new leadership felt it was right.

There is a MQA program with respect to signs and pavement markings. It was established in 2006. Asset types and quality of assets are checked twice annually using GIS/GPS units. The objective is to meet federal standards and does not require citizen input. Specifically the following are measured: pavement condition, roadside (mowing, litter and debris, brush/ tree control or landscaping, sloping, guardrail), traffic control (signage, pavement markers and striping, symbols), and winter or seasonal maintenance.

State: Kansas (KA)
Organization: Kansas Department of Transportation
Interviewee: Robert Fuller, Staff Engineer
Date: September 23–24, 2008

The Kansas Department of Transportation (KDOT) has conducted several surveys: an External Customer Survey in 1997; an External Customer Survey in 2000, 2003, and 2007; and a Post-Construction Survey in 2007 (however, this survey did not pertain to this study). The 1997 survey measured customer satisfaction of maintenance operations specifically and was conducted to set customer-based target values for the MQA Program. The 2000, 2003, and 2007 surveys focused on customer satisfaction with the organization's maintenance operations in general. All surveys were administered to Kansas residents and were developed by a committee of maintenance staff. The surveys were administered by ETC Institute.

The first survey was used to develop performance measures, while the more recent surveys assessed satisfaction with KDOT services and determined what could be improved; in short, the data are performance indicators and are also used to benchmark KDOT services across neighboring states. Maintenance staff annually reviews MQA standards to determine if the measures need revising, and survey data are considered in these reviews. The overall maintenance assessment and rating are directly tied to KDOT's budget. To maintain certain standards, benchmarking their results against previous years is more important than benchmarking against their peers.

State: Kentucky (KY)
Organization: Kentucky Transportation Cabinet (KTC)
Interviewee: Jon Wilcoxson and Tracey Nowaczyk, Transportation Engineer Branch Manager
Date: September 23–24, 2008

The Kentucky Transportation Cabinet (KTC) conducted an Annual Assessment of Customer Needs and Satisfaction in 1997, which measured customer satisfaction with the organization's overall performance of maintenance operations and customer opinions about Kentucky roadways, as part of a national NQI initiative. The Kentucky Transportation Center developed the survey and administered it in conjunction with Preston-Osborne Research. The survey was administered to licensed Kentuckians over the age of 18. The goal of the survey was two-fold: to set guidelines and maintenance priorities for a MQA program and to benchmark against a 1995 national study. The data from the survey, however, did not impact funding; rather, data were used as a proxy for customer opinion and used to make decisions on a general basis. Being that the survey was conducted

over a decade ago, KTC would like to conduct a follow-up customer survey.

While customer input is important to KTC's MQA program, it is not specifically sought out. KTC grades their own levels of service, and having more customer input on maintenance operation measures (such as ranking maintenance operations in order of importance and perceptions about the conditions of bridges, roadways, pavement, roadsides, etc.) would help KTC to interpret these scores. Benchmarking their service levels from year to year is also helpful, but KTC does not compare their service levels or satisfaction thereof with other agencies. From this study, KTC would like to know how customer research is funded, the associated costs of research, and who is conducting routine customer research.

State: Louisiana (LA)
Organization: Louisiana Department of Transportation and Development
Interviewee: Steve Ken Houser, Maintenance Management Coordinator
Date: November 6, 2008

The Louisiana Department of Transportation and Development (DOTD) produced the Business Process Improvement Program Team 9: Customer Input Report. This survey focused on customer satisfaction of maintenance operations and surveyed Louisiana highway users who drove at least 20 miles per week in a motor vehicle on state highways. The study helped to establish a management plan, integrating customer priorities (such as road surfaces, signage, and bridges) as a key component and to develop performance measures.

The Customer Input Report used data from the 2003 survey and included follow-up focus groups. The data were used to develop a

maintenance management system and to support budget requests. Both surveys were developed by a multi-functional team comprising an outside consultant and internal staff. The Customer Input Report was customized and administered by a consultant research team (Dye Management). The survey was pre-tested with residents.

DOTD has a maintenance operations quality assurance program, and they are currently working on a performance-based maintenance planning and management system, for which customer input is required. They plan to administer their survey every five years.

State: Maryland (MD)
Organization: Maryland Department of Transportation State Highway Administration (SHA)
Interviewee: Russell Yurek, Director of Office of Maintenance
Date: September 23–24, 2008

The Maryland Department of Transportation State Highway Administration conducts an External Customer Survey biannually that measures customer satisfaction with the organization's overall performance. The survey is administered to Maryland Residents with valid driver's licenses who are between the ages of 18–69. Results from the survey were used for the Agency business plan, MCARS measures, funding and legislation, and program improvements. Findings from the survey were used to request an additional 1.4 million from

the state Legislature. The survey was developed and administered by the Shaefer Center for Public Policy/University of Baltimore and SHA. SHA uses customer satisfaction data to correlate what customers want and expect with services provided. MCAR's performance measures are centered on customer perspective. Survey data provided SHA with a means to convey the importance of maintenance and how it compares against other programs for money. The key was to see what customers were feeling, as opposed to what they thought was important.

State: Michigan (MI)
Organization: Michigan Department of Transportation
Interviewee: Cory Johnson, Transportation Planner, Asset Management Section
Date: September 23–24, 2008

In April 2006, Michigan Department of Transportation (MDOT) conducted a customer survey—Painted Rumble Strips on Michigan Freeways—which measured and assessed driver and community perceptions of specific edge line pavement marking patterns on shoulder rumble strips. The survey, administered by a consultant research team (Public Sector Consultants, Inc.), comprised two components: a mail survey of residents whose homes were near the freeway and focus groups of frequent users of the interstate highway. Using painted

rumble strips was experimental, and customer input garnered from the survey was one of the experiment’s measures used to indicate which of the test stripes were preferred by highway users. From the survey, MDOT was able to understand how the public perceived pavement markings and learned that the public, planners, and construction engineers all have the same goals in mind, namely public safety, and that certain pavement marking patterns and terminology e.g., wet night retro reflectivity had little meaning to the general public.

State: Missouri (MO)
Organization: Missouri Department of Transportation
Interviewee: Ernie B. Perry, Director, Research and Development Specialist
Date: November 12, 2008

The Missouri Department of Transportation (DOT) administered an annual statewide customer survey beginning in 1998 when consumer surveys were en vogue and there was an increased effort to execute customer satisfaction surveys. Conducting these customer surveys on a yearly basis led to the creation of the Performance Management System designed to direct budgets, monitor progress on maintenance and forecast needs. To ensure the questions are up-to-date and that each department/issue is clearly represented, the content for the survey is approved each year by department Executives. All questions reference an element in the Performance Management System (ex: how satisfied are you with Missouri DOT or how would you rate this funding option, etc) which informs Missouri DOT how each element is

performing—what needs attention, what to budget for, where to cut budget, etc. Once the content is approved, a consultant manages data collection. Missouri DOT continues to administer telephone surveys because, in their experience, online and Mailout methodologies are too cumbersome and unreliable. A randomized sample was stratified by 12 state districts (each district has a sample size of 350) and was weighted to account for rural/urban. Overall they had an 85% margin of error. After data collection, the consultant performs basic data analysis and provides Missouri DOT with a summary report.

In addition to the annual statewide customer survey, Missouri DOT also administers surveys via rest area drop cards, commuter parking lot cards, and organizes road rallies.

State: Mississippi (MS)
Organization: Mississippi Department of Transportation
Interviewee: Steve Ken Houser, Maintenance Management Coordinator
Date: November 10, 2008

In the summer of 2008, the Mississippi Department of Transportation (DOT) contracted with Dye Management to design and install a Maintenance Management System. As part of this process, Dye Management proposed for the Mississippi DOT to conduct a telephone survey in order to gather feedback on highway maintenance directly from their customers. Respondents for the telephone survey were Mississippi licensed drivers that had to drive at least 25 miles a week. The goal was to gather data on the public's perception on maintenance issues in order to validate the Maintenance Department's own data collection on maintenance conditions and to validate department budgets. Dye Management designed a customized survey, managed data collection and data analysis, and then submitted a summary report of the survey findings to Mississippi DOT Executives. As a second phase, Dye Management conducted focus groups to reinforce findings from the telephone survey. The Mississippi DOT reports that the results from the 50-question telephone survey were especially helpful for validating the Maintenance Department's allocation of budget. In the future, they would exclude the qualitative portion of the project because the focus groups were less informative than the telephone survey.

The Mississippi DOT has a Maintenance Quality and Assurance (MQA) program that conducts field condition surveys. Historically, they have not had performance measures, but with the implementation of the MMS it is projected they will have performance measures in three years. The most important measures for a consumer survey of maintenance operations include:

- 1) Satisfaction with specific maintenance operations areas - Need to know how the public rates maintenance operations.
- 2) Impact of maintenance on customer travel time delays - Good to know what the impact really is— if highway maintenance causes citizens to leave 20 minutes early to get to work, MSDOT needs to know that.
- 3) Perceptions about the conditions of bridges, roadways, pavement, roadsides, etc - If citizens are not happy with the conditions of bridges and pavement, they need to know.

While the least important measures include:

- 1) Knowledge of the agency responsible for highway maintenance, and
- 2) Trust in agency's ability to maintain highways.

State: Montana (MT)
Organization: Montana Department of Transportation
Interviewee: Brandy Hamilton, Maintenance Budget Analyst/DES Program Manager
Date: February 10, 2009

The Montana Department of Transportation has conducted a customer survey, the Perceptions of Highway Maintenance in Montana, every two years beginning in 1996. Overall, the organization has conducted seven of these surveys. This survey specifically measures customer satisfaction on maintenance operations and randomly samples residents throughout the State of Montana.

The survey results are currently being used to measure the public's views on Montana highway maintenance. They specifically compare the results from year to year to assess public awareness of maintenance services and changes in their attitudes about the quality of the services. They also use the results to compare the public's perceptions of the quality of highway maintenance compared to other states (this is done through questions in the survey itself). The organization contracts the survey with Montana State University, Center for Applied Economic Research Survey Center.

The customized survey is administered by the consultant research team, and the data is reviewed internally to determine what the public perceives as being done well and what is not being done well. Items covered in the survey include, road information, rest areas, attitudes towards seatbelt use, automobile accidents, and driving habits, with winter maintenance, availability of information to the traveler, and surface maintenance being the three most important measures.

Directors use the data to set priorities; the results or findings do not affect their funding levels.

The organizations do have a maintenance operations quality assurance program along with measures related to maintenance operations; however, neither requires customer input. They do benchmark the organization as compared to neighboring states and address this in the survey.

State: North Carolina (NC)
Organization: North Carolina Department of Transportation
Interviewee: Jennifer Brandenburg, State Road Maintenance Engineer
Date: November 6, 2008

The North Carolina Department of Transportation (DOT) administered a Customer Satisfaction Survey in 1998 when consumer surveys were popular and there was an increased effort to execute customer satisfaction surveys.

No customer input is used for the Maintenance Condition and Assessment Program. All performance measures for the MCAP are driven by engineering analysis. North Carolina DOT believes conducting customer surveys would be

“useful and well-received.” However, the logistics of performing customer surveys is what hinders them from executing a survey. The maintenance operations that could be covered in a customer survey include roadway condition, and roadside and winter/seasonal maintenance. The most important measures in a customer survey for maintenance operations are importance of various maintenance operations and public perception of conditions.

State: North Dakota (ND)
Organization: North Dakota Department of Transportation
Interviewee: David Leingang, Business Planner
Date: December 15, 2008

In an effort to identify what the public values as the most important aspect of highway maintenance and how they are performing in those areas, the North Dakota Department of Transportation (DOT) has conducted a Customer Satisfaction Survey, covering multiple topics, including highway maintenance operations, every two years since Spring 2004. They believe conducting this survey every two years is a good business practice in order to justify maintenance costs and departmental budgets.

With the guidance of the North Dakota DOT Strategic Planning Workgroup, the University of North Dakota leads the survey effort. This survey instrument, originally designed by the University of North Dakota, has remained unchanged since 2004. The sample includes four respondent groups; Residents, Motor Carriers, Government Officials, and Business Owners. Once data collection is completed, the University produces a report, which is then distributed to each of the eight districts and the 35 maintenance managers who review the data compared to their process and areas of expertise.

State: Nebraska (NE)
Organization: Nebraska Department of Transportation
Interviewee: Ernie Craig Lind, Highway District Engineer
Date: November 6, 2008

The Nebraska Department of Transportation has collected customer data focused on multiple topics, including maintenance operations, since 1997 through four separate Nebraska Resident Satisfaction Surveys ('97, '01, '04, '08). These surveys were conducted in order to periodically measure customer service and satisfaction with residents of Nebraska and to identify areas for improvement to guide future policy and direction of the Department of Roads.

A committee comprised of the Nebraska Department of Roads NDOR Planning Division staff and NDOR Director and Deputy Directors developed the customized survey questions. The multi-functional team decided upon a telephone survey methodology with 1,800 respondents

selected by computerized random digit dialing. The survey was administered by the Bureau of Sociological Research at the University of Nebraska-Lincoln, who collected the data and provided a raw data file for analysis. The data were then analyzed by NDOR planning staff and summarized in a written report distributed by planning staff.

The results were compiled into a report and distributed to NDOR Management (Directors office, Division Heads, and District Engineers). This year, an article written on the summary results was published and distributed to all employees and many external partners of NDOR. The results help to guide future policy and planning but not how funds were allocated.

State: Oregon (OR)
Organization: Oregon Department of Transportation
Interviewee: Luci Moore, Statewide Maintenance and Operations Engineer
Date: December 4, 2008

In order to determine public opinion on the most important aspects of highway maintenance and how they are performing in those areas, the Oregon Department of Transportation (DOT) has conducted a State Highway Quality Customer Survey every two years. Oregon State University manages the survey process, which includes survey administration, data collection, and production of a summary report. Oregon DOT administers the same survey each year to a random sample of Oregon citizens who are registered with the DMV and have valid driver's licenses.

Upon completion of data collection, the data are broken down by maintenance district. Results for each district are then compared to one another. The Oregon DOT will also compare each district to the statewide data.

Through this analysis, ODOT is able to identify areas that require improvement and also helps to justify any requests for additional funds for those areas that are underperforming in the eyes of the customer. The data also provides "firepower" to dispute concerns from "small constituencies" who have complaints or to support data gathered by other means. For example, Oregon DOT performs its own evaluation of pavement conditions, the results of which are satisfactory. However, results from the customer survey may suggest 20% of respondents are unhappy with pavement conditions. The information can then be shared with the Legislature in order to improve upon an issue their constituency is concerned with.

The MQA program is managed through the Highway Quality Survey, which is managed in house. In this survey, customer surveys are combined with performance.

State: South Carolina (SC)
Organization: South Carolina Department of Transportation
Interviewee: David Cook, State Maintenance Engineer
Date: September 23–24, 2008

The South Carolina Department of Transportation (SCDOT) conducted a Highway Maintenance Survey in 2004 that measured customer satisfaction and areas of importance. Any previous measures or program directions had only been based on anecdotal information from customers via telephone or written correspondence. To provide more concrete guidance on maintenance programs, SCDOT decided to conduct this survey and give the public the opportunity to communicate their needs and perceptions of services that were most important to them. This decision resulted from a recommendation from TRB Report 422. The survey was developed by a contractor, University of South Carolina, and agency staff, and was administered by the Division of Research of USC's School of Business. Since this survey, SCDOT has not conducted another of its type.

SCDOT also has a Maintenance Customer Survey program that routinely surveys

maintenance customers who have recently had direct contact with one of SCDOT's maintenance units through the submission of a work request. A small percentage of the customers are randomly selected once their work request is completed. Contact information is collected when the work request is submitted and associated with the work request. The survey cards are mailed with return postage prepaid. Information is collected on the performance of four areas. These areas are: professionalism, completeness, timeliness, and overall satisfaction. The survey cards are also used as a tool to educate customers. They include facts and challenges pertaining to SCDOT.

SCDOT has a maintenance operations quality assurance program, Maintenance Assessment Program (MAP), which began in 2003. This program assesses the states' maintenance operations and performance. SCDOT supports benchmarking against other agencies, but only those that are similar in scope and mission.

State: Tennessee (TN)
Organization: Tennessee Department of Transportation
Interviewee: Patsy Mimms, Director, Office of Strategic Planning
Date: November 13, 2008

The Office of Strategic Planning within the Tennessee Department of Transportation (DOT) is responsible for administering a Statewide Customer Survey in 2006, with a subsequent survey planned for 2009. Given limited resources (budget, staff), Tennessee DOT was motivated to provide the most efficient transportation services for their customers. Maintenance of the transportation system was one of the key factors on which feedback was requested. The Office of Strategic Planning had oversight of the project to gather feedback from customers. The feedback helped to reinforce the professional thoughts and perspective of TDOT's professional engineers and staff that the department was doing an effective job on the highway maintenance performance.

In 2005, with the guidance of a steering committee made up of Field Operations staff and Community Relations personnel, Tennessee DOT issued an RFP and hired a consultant to lead the survey effort. An important aspect in the RFP included a task to research the best practices of what methodologies other states were using. Additionally, working groups that had been a part of the Tennessee DOT 20 Year Transportation Plan effort, participated in interviews and focus groups to help guide survey content. The consultant also conducted focus groups with employees to gain insight and help guide decisions for the survey. The 2006

customer survey was customized specifically for Tennessee DOT and covered multiple topics, several of which included highway maintenance, i.e., landscaping, guard rails, surface condition, stripping, etc. Surveys were distributed to a random sample of Tennessee residents from across the state and an even representation of demographics, including urban vs. rural residences. Once the data was collected, the consultant presented the survey findings to TDOT leaders. The Office of Strategic Planning worked with staff to include follow up to the survey as part of the department's strategic plan and responsibilities were assigned to appropriate bureaus and divisions who organized internal teams to work with the data on priority areas.

There was a three-year gap in between surveys to allow for progress based on the changes made given the outcome of the 2006 survey. Changes for the 2009 effort include a new steering committee and requesting the consultant to do an initial assessment about current strengths and weaknesses before modifying survey.

As of January 2009, the survey administration has been postponed due to recurrent revenue shortfalls and continuing budget concerns.

Website Survey Research Resource:
<http://www.tdot.state.tn.us/osp/surveylinks.htm>.

State: Tennessee (TN)
Organization: Tennessee Department of Transportation
Interviewee: Chris Harris, Civil Engineer Manager I
Date: November 7, 2008

The Tennessee Department of Transportation (DOT) has an MQA that is built into the Maintenance Department's job function. They do not currently collect customer input or statistics. Instead, their focus is on MRI condition assessment performed by field staff and entered into the maintenance system, which is then used for creating and allocating budgets. In 2006 (estimated) a customer survey was conducted. The data from that survey was given to the Executive team who then dictates how to prioritize their budgets.

The Executive staff has gathered this information from the public in the past and has given it to the Maintenance Division. The only concerns, especially given the current economic situation, are costs—what are the benefits of the data vs. the costs? Executives would be more likely to implement consumer surveys if they were Federally funded rather than State-funded. Tennessee DOT believes having a “champion” from the Strategic Planning Department or the

Customer Service Department is the best strategy to sell the idea of consistently collecting customer data.

Maintenance operation customer surveys should focus on safety—pavement marking, visibility at night, signage, and of course condition of pavement and bridges in an effort to reduce fatalities.

The top three customer measures include:

- 1) Satisfaction with specific maintenance operations areas - where can we best spend the money to have the most impact.
- 2) Ranking of maintenance operations in order of importance - knowing what the public prioritizes.
- 3) Impact of maintenance on customer travel time, delays, and costs.

Knowledge of the agency responsible for highway maintenance is reported to be the least essential. Tennessee DOT is interested in learning more about how to use the data once it is collected.

State: Virginia (VA)
Organization: Virginia Department of Transportation (VDOT)
Interviewee: Robbie Prezioso, Acting State Maintenance Engineer – Maintenance Division
Date: September 16, 2008

The Virginia Department of Transportation (VDOT) conducts a Dashboard Customer Satisfaction Survey (CSS) twice a year and other miscellaneous project research as needed. Specifically, the CSS measures customer satisfaction on VDOT's maintenance operations and is randomly administered by telephone to Virginian residents. This survey gathers and assesses customer feedback on VDOT programs to better target and evaluate their efforts. VDOT Public Affairs Staff and Senior Executives, as well as consultant researchers, developed the custom survey, which culminates from 15 years of data, but the Southeastern Institute of Research administers the survey.

The survey acts as a public and corporate performance monitoring tool; data are published on the agency's Dashboard Website. Furthermore, the survey data are being used to evaluate and plan for future investments for many VDOT programs. Thus far, VDOT has seen good results from the survey data, but they continue to refine their survey questions with each wave. VDOT does have a maintenance operations quality assurance program, but it does not require customer input or statistics. Likewise, VDOT employs maintenance performance measures, but with no customer input. VDOT does, however, feel that benchmarking customer opinions is important.

State: Washington (WA)
Organization: Washington State Department of Transportation
Interviewee: Anna Zaharris, Maintenance Accountability Process Specialist for Maintenance & Operations, Policy Division
Date: November 6, 2008

The Washington State Department of Transportation (DOT) has collected customer data focused on maintenance operations beginning in 1997 through four separate surveys; Truckers Survey (1997), Biannual Rest Area In-person Customer Surveys (2000-2004), and Telephone Maintenance Customer Survey (2000, 2005). Washington State DOT was motivated to collect public opinion on maintenance operations based on the outcome of an accountability survey conducted in the mid-1990s by a consultant. The outcome of this study was the development of the Maintenance Accountability Program (MAP), along with recommendations for focus groups and telephone surveys conducted every five years. The original Maintenance customer survey results assisted in setting the MAP Level of Service targets. Subsequent surveys were performed for comparison and trend analysis, and to ensure that they were meeting customer expectations. These customized surveys were designed by an internal planning committee, and then administered to Washington residents, 18 years or older who had a driver's license, by a

consultant that managed data collection and the summary report.

The data from the Maintenance Customer Survey was used in conjunction with the MAP to determine if their process measures were aligned with customer expectations and to assist with focusing programs for improving maintenance. However, the results from the Maintenance Customer Survey did not affect budget allocations.

The MAP is an outcome-based performance process that covers 32 maintenance activities. It has specific criteria for evaluating each activity, but does not have customer input. Customer input is obtained through the Maintenance and Rest Area customer surveys. It is important to know how customer satisfaction has changed over time, but this will not be used as the sole basis for any significant change in program direction. Customer survey results are used in conjunction with other tools and resources available to support the professional judgment of maintenance managers.

State: Wisconsin (WI)
Organization: Wisconsin Department of Transportation
Interviewee: Scott Bush, Manager, Maintenance Quality Assurance (Compass)
Date: January 22, 2009

The Wisconsin Department of Transportation (DOT) administered a Customer Satisfaction Survey in 1996, 1997, and 1999 when consumer surveys were popular and there was an increased effort to execute customer satisfaction surveys. Conducting these customer surveys on a yearly basis with the same survey framework helped the Wisconsin DOT understand the public's priorities for highway maintenance and perceptions of how the DOT performed highway maintenance. Over time, Wisconsin DOT was able to benchmark their findings and evaluate trends. A consultant, the Wisconsin Survey Research Laboratory (WSRL) was responsible for the survey design, data collection, and preparation of the report. Each year the survey, which focused on highway maintenance and

traffic operations, was administered to Wisconsin residents via telephone. The results helped Wisconsin DOT validate budgets and allocate resources. The MQA program is known as Compass but does not require customer input. Compass manages an annual assessment of roadway shoulders, markings, signage, etc. as part of the internal maintenance review. Wisconsin DOT does not do customer surveys for the MQA program because of lack of resources—staff and budget. Executives believed the output from the customer surveys has become stagnant and predictable. Since there were no fresh insights from the customer survey, it was not seen as a priority and cut from the budget.

State: Wyoming (WY)
Organization: Wyoming Department of Transportation
Interviewee: Dave Hamilton, Maintenance Staff Technician
Date: September 23–24, 2008

The Wyoming Department of Transportation (WYDOT) has conducted customer surveys in recent years. While WYDOT has a maintenance operations quality assurance program, customer input is not required. The bi-annual customer surveys conducted by WYDOT do not provide detailed customer input on the items being measured by their MQA program. Should WYDOT conduct a customer survey of maintenance operations, the most important

item to measure would be perceptions about the conditions of bridges, roadways, pavement, roadsides, etc., with a specific focus on roadways and roadsides. Conditions they would not cover are bridges (which are not included in Maintenance), pavement (which is managed by the Materials Program through WYDOT's Pavement Management System), and traffic control signage.

Concluding Observations

This section details highlights of the observations made from the exploratory activities; they are organized into three key categories:

- 1) Documentation of why, where, and when state SHAs have collected customer surveys
- 2) Effective strategies used by agencies to report and use customer data
- 3) Issues and obstacles to conducting and using customer research

Documentation of SHA customer surveys

This review captured information on over fifty customer surveys conducted by State agencies in the past twenty years. While some of these surveys were conducted at a single time, a number of SHAs have conducted customer surveys more than once or on a regular basis, including Maryland's MSHA Customer Satisfaction Survey, Minnesota's Omnibus Customer Research Study, Montana's Customer Survey, Pennsylvania's Annual Voice of the Consumer Survey, South Dakota's Statewide Customer Satisfaction Assessment, and Washington's Maintenance Customer Survey.³

The literature review and interviews with SHAs shed light on why and when state SHAs conduct customer surveys. Despite the recommendation in NCHRP Report 422 to consider customer input in developing MQA program measures and to continually measure customer satisfaction as a part of the program, the number of states doing so as a formal process as part of their MQA program are few. Furthermore, interviews with persons responsible for customer research revealed they were generally unfamiliar with this report or the implementation guidance. Still, this research indicated that SHAs are conducting customer research to inform targets for level of service (LOS) and to monitor ongoing performance; those that are doing this on an ongoing basis are doing so because they see the value in it and apply the data to their operations planning decision-making. The following offers highlights of the range of customer survey efforts reviewed in Task 1:

- In 2005, in developing their level of service maintenance management systems, Arizona DOT conducted customer surveys to assess the public's perception of ADOT's maintenance performance. The surveys were in the form of focus groups of randomly selected citizens, and the results

³ While we were unable to locate their surveys or interview practitioners in their state agencies, the literature review indicated that a number of states including Colorado, Oregon, Illinois, and Florida have also implemented customer surveys on their maintenance operations on a regular basis.

provided a link between LOS targets and public expectations and helped determine how customer expectations could be tied to budgets.

- California’s customer surveys are used to determine how public perception of the state’s maintenance performance compares with their own level of service evaluations. Public surveys of maintenance programs have been suspended due to excessive cost and “staleness” of data.
- Since 2000, the Florida DOT has conducted a cycle of focus groups and surveys on six customer segments to obtain feedback to guide process improvements and program modifications. The survey does not focus on maintenance operations.
- In 2005, the Louisiana Department of Transportation and Development’s (DOTD’s) highway maintenance program gathered customer input as a means for establishing its performance based maintenance management and planning process. A survey of Louisiana residents was conducted to provide an evaluation of DOTD’s highway maintenance program and clarify their current and desired levels of service for highway maintenance. To validate the survey findings, three sets of focus groups were held with residents.
- In 2008, the Mississippi Department of Transportation conducted its first customer survey about highway maintenance as part of its maintenance management System. The survey is currently being used to validate MSDOT allocation of budget; no performance measures have been established yet.
- Mn/DOT is recognized as a leading department of transportation in conducting customer surveys for maintenance. Mn/DOT uses the customer input to determine where it should place programmatic emphasis and has used market research to establish LOS targets. One example of this is the setting of regain time targets for snow and ice service.
- Montana Department of Transportation has conducted a biennial customer survey, Perceptions of Highway Maintenance in Montana, since 1998; however, soliciting customer input is not a requirement of the department.
- Oregon DOT conducts a State Highway Quality Survey every two years; the survey is focused on the agency as a whole but does contain a few questions on maintenance.
- Starting in 1995, the Pennsylvania DOT instituted an annual mail survey of motorists to track performance of the agency’s county maintenance units. In 2000, the agency undertook research to provide more specific and actionable customer feedback on the dimensions of highway quality that are most important to motorists. The survey is customized for each county and is conducted annually.
- In 2004, South Carolina Department of Transportation conducted its first (and only) Highway Maintenance Survey based on NCHRP Report 422’s recommendation to collect and consider public input as part of their MQA program.
- Washington DOT has conducted several surveys, including a Maintenance Customer Survey (baseline in mid 1990s, 2000, and 2005) and Rest Area Customer Survey (annually since 2004). The former survey was initially conducted to assist in setting MAP (Maintenance Accountability Process) level of service targets, and subsequent surveys were conducted for trend analysis and to ensure the agency was meeting public expectations. The latter rest area survey was conducted to assess the public’s perception of the agency’s customer service and identify those areas in need of improvement.

Effective Strategies Used by Agencies to Report and Use Customer Data

Interviews with state practitioners demonstrate a shared interest in what other agencies are doing with regard to using customer input for their program’s benefit. While, by far, most SHAs are using customer input to monitor customer satisfaction, some have used the data more constructively than others. As shown in the following examples, customer research data use ranges from using the data to develop performance measures to using it as a basis to justify the budget for a needed process improvement.

- California DOT customer surveys validated the agency’s belief that the public’s maintenance priorities were the same: safety, preservation, and service. It did identify some safety areas that needed improvement, which resulted in these items receiving special focus in the Department’s strategic plan. As a result, some maintenance funding was reallocated to address these safety improvements.
- Iowa Department of Transportation has conducted two surveys (2002 winter services and 2006 general maintenance), which collected data on Importance versus Performance, allowing the agency to conduct a “gap analysis” and identify items that were of high importance to residents, but that Iowa DOT was performing poorly. This led to assignments for each maintenance division.
- Louisiana is using their customer data in their current budget meetings with the state legislature.
- North Dakota DOT’s Customer Satisfaction Survey (contains one or more questions on maintenance, but assesses the organization’s overall performance) is used to help justify budgets and personnel resources. It provides information on when a certain maintenance operation needs more funding or manpower.
- Virginia DOT is using the latest Dashboard Survey to evaluate investments and plan strategies for future investments.
- Washington DOT uses their Maintenance Customer Survey data in conjunction with the Maintenance Accountability Process to assess whether performance measures are aligned with customer expectation. While the customer survey data helps the state identify program priorities, it does not affect budget allocation decisions. Washington DOT also conducts a Rest Area Customer Survey and follows up with negative comments, but also uses survey results to affect allocation decisions within the rest area realm only.

Issues and Obstacles to Conducting or Using Customer Research

This effort interviewed 32 state practitioners about their efforts or interests in conducting and using customer input to inform their maintenance operations. One-half of the interview questions focused on the practice of measuring customer satisfaction, in general, including their opinions on information gaps or needs in this area. The following summarizes the issues/obstacles to conducting customer surveys and information needs to support their customer research efforts that were most frequently raised:

- Promoting the value of customer input if it is not already required

Some states that do not require customer input report a perception that doing so is not always helpful for a program and that their own internal quality assurance program is sufficient in identifying program improvements and justifying budget requests.

- Designing and Administering surveys

Regardless of whether or not the state practitioner interviewed represented an agency with current or past experience with conducting customer research, most offered information needs regarding research design and administration. These include:

- ✓ When sampling on geographic basis (e.g., regional, district, or rural/urban/suburban), what is a sufficient number of residents to interview?
- ✓ How do you account for cell phone use in sampling? Cell phone respondents seem to be mostly a younger generation.
- ✓ In mail surveys, how can you address non-contact issues (e.g., when residents move making it difficult to reach them)?
- ✓ What are examples of good, sound, objective maintenance-specific survey questions?
- ✓ What methods are successfully used to interpret customer data?

- Funding

A major constraint to conducting customer research is funding (e.g., not having staff available to manage or conduct the research even if it were conducted by a consultant, lack of budget to

conduct a survey). Interviewees queried, “how would we fit a survey into our already limited budget?” and “Why should we do it? We need to convince the Commissioner or Chief Engineer conducting customer research would be worth the expense.”

- Using Survey Results.

By far, practitioners want information on how survey data are being used by state SHAs.

Questions they asked included:

- ✓ What vehicles are used for integrating the data into a SHA’s process?
- ✓ How do you use customer input effectively?
- ✓ How do you monitor trends?

3. Case Studies

This chapter presents seven case studies to illustrate a range of best practices used by SHA maintenance organizations in conducting customer research for their maintenance. It first details the method for conducting the interviews including the strategy that was applied for selecting the case studies. This is followed by the seven case studies. A copy of the case study interview guide is contained in Appendix C.

Method Overview

Case studies were selected using an information-oriented strategy, where cases are selected to demonstrate a characteristic or attribute of interest. The following characteristics were considered for selection of each case study: (1) the candidate SHA has “institutionalized” customer research within their maintenance operations and are conducting customer research on a “continuous” or regular basis (a repeat of the same or similar research every few years), (2) the candidate state’s survey of focus follows good research practices, and/or (3) the candidate has overcome issues or obstacles in conducting customer research and/or has applied research data to program decision making. The eight customer research efforts were identified for panel review, and the rationale for their selection is outlined below:

Programs That Have Institutionalized Customer Research into Maintenance Operations

- 1) **Florida Department of Transportation:** Since 2000, Florida DOT has engaged customer input using a cycle of qualitative and quantitative research as part of its performance measurement program. The agency has clearly delineated six customer segments: residential travelers, commercial customers, government officials, visitors, special needs customers, and property owners affected by transportation construction. Customers are further segmented geographically (northern, central, and southern parts of the state). The process for integrating customer research into performance measurement has been documented in many case studies.
 - **Performing organization:** Florida Department of Transportation and the University of Florida.
 - **Rationale:** Many resources have documented FDOT’s customer-centric approach to measuring performance. This case study will focus on the involvement of the agency’s office of maintenance in the research and data analysis process and on the impact of the survey results on decision-making process improvements.
- 2) **Maryland State Highway Administration Customer Survey:** The Maryland State Highway Administration conducts a biannual customer survey to assess customer satisfaction with agency operations. In doing so, the agency has purposefully worked with its maintenance program to craft questions included in the survey on maintenance operations. Furthermore, the maintenance program has routinely used the results of the survey to track performance and to make budgetary decisions regarding program improvements and set priorities.
 - **Performing organization:** MD SHA in collaboration with Schaefer Center for Public Policy.
 - **Rationale:** Though this is a broad-based agency-wide survey, the maintenance operations have been actively involved in crafting questions and using the data for program decision-making. The case study will focus on this collaboration and on how the agency makes use of the data.
- 3) **Minnesota Department of Transportation:** To incorporate the customer voice into maintenance operations, Mn/DOT has built significant internal capacity to conduct research and has instituted and conducted a number of customer research efforts focused on

maintenance, including an annual survey and focus groups on maintenance practices and intercept and personal interviews with roadway users and employees.

- **Performing organization:** Mn/DOT Market Research Unit; Office of Policy Analysis, Research and Innovation.
 - **Rationale:** The Mn/DOT case study will focus on the maintenance operations-specific surveys and focus on many of the research process improvements that have been made in recent years (e.g., mode use/consideration of cell phone impact on sample design, questionnaire development) and end use of the data.
- 4) **Missouri Department of Transportation's Transportation Customer Survey:** MoDOT conducts a number of customer surveys including a statewide survey since 2000. The survey measures customer satisfaction on the organization's performance on a whole, but also includes questions specific to the maintenance division's needs. The survey was refined in 2003. Conducting this and other surveys (rest stop, parking lot) contributed to the creation of the agency's performance management system, which directs budgets, monitors progress on maintenance operations, and forecasts needs.
- **Performing organization:** MoDOT and University of Missouri-Columbia.
 - **Rationale:** MoDOT has pursued customer input in a variety of ways depending upon the complexity, time, and cost of the effort. The University of Missouri-Columbia has assisted with the development and refinement of the annual customer survey.
- 5) **Pennsylvania Department of Transportation Customer Surveys:** With a long history of putting customers first and considering their needs, PennDOT uses customer information to drive its decision making in a number of ways. While many case studies already review how the agency's customer research has evolved over the past 20 years, this case study will focus on those efforts specifically targeting highway maintenance operations and how this well-developed process has impacted maintenance operations and resource decisions.
- **Performing organization:** Pennsylvania Department of Transportation and the Center for Customer Surveys (internal within PennDOT).
 - **Rationale:** This case study will focus less on the history of PennDOT's customer satisfaction activities and more on those related directly to maintenance (e.g., the annual County Maintenance Customer Satisfaction Survey and a supplemental survey, the Biennial Quality Use Importance Knowledge survey). It will also document the refinements made to the survey over time and how survey data was used.
- 6) **Washington Department of Transportation Maintenance Customer Surveys:** The Washington State Department of Transportation has collected customer data focused on maintenance operations beginning in 1997. WS DOT was motivated to conduct customer research as a result of a study recommendation, which led to the development of the organization's Maintenance Accountability Program (MAP). The first survey set MAP level of service targets, and subsequent surveys have assessed customer satisfaction against the baseline data and tracked trends.
- **Performing organization:** Washington Department of Transportation and consultant teams, depending upon available resources.
 - **Rationale:** WA DOT utilized customer input to develop its outcome-based performance process, MAP, level of service. While it currently does have a system for comparing customer expectations with its process measures, the results of its survey efforts do not affect budget allocations. This case study would focus on the process for establishing the baseline study and obtaining management support for customer research, the agency's research processes and instrument, and challenges it has faced in securing resources to conduct customer research.

Agencies with “One Time” or Recent Experience in Implementing Customer Research in Their Maintenance Operations.

- 7) **ADOT Customer-Oriented Level of Service Maintenance Management System:** The Arizona Department of Transportation began conducting customer research in 1999 and 2001 as a means for assessing public opinions about road maintenance on state highways. In 2005, ADOT conducted customer research to establish a customer-oriented level of service (LOS) maintenance management system. Drawing upon a review of best practices by other states, ADOT conducted a telephone survey and focus groups with residents to assess the public’s perception of ADOT’s maintenance performance.
 - **Performing organization:** Arizona Department of Transportation and Dye Management Group, Inc.
 - **Rationale:** While ADOT had previously conducted a series of customer surveys to inform its maintenance operations, this effort represents the agency’s effort to implement customer research in the development of its LOS maintenance management system. Furthermore, ADOT utilized both telephone and focus group research approaches, including focus groups with employees as a means for assessing the extent to which agency staff are aware of public perceptions regarding maintenance. A concern of ADOT was determining how customer service data might be used in setting performance targets and tying customer expectations to budgets. This case study will explore, among other things, ADOT’s approach to overcoming this challenge.
- 8) **Louisiana DODT Business Process Improvement Program Customer Input Survey:** Incorporating customer input into defining Louisiana’s DOTD’s level of service (LOS) for its maintenance management program was the impetus for conducting customer research in 2007. Customer input was gathered using a telephone survey and focus groups to pretest the survey instrument and to provide further insights on the survey data. The data was used for developing the LOS and are being used to support current budget requests.
 - **Performing Organization:** Louisiana Department of Transportation and Development and Dye Management Group, Inc.
 - **Rationale:** Though this is a one-time effort, Louisiana DODT plans on conducting the survey every five years. In addition, the research practices incorporated a mix of telephone and focus group research. Findings are currently being used to support budget requests; the case study will report on the results of these efforts.

Primary research for each case study was conducted via telephone by a NuStats consultant from June 2, 2009 to July 15, 2009. A point-of-contact, identified during the survey interviews of state practices, as the most knowledgeable of the research for each state DOT was contacted and scheduled for a one-hour interview at a date and time of their convenience. If applicable, the contact arranged for other individuals to be present during the conference call so they could provide their input and perspective.

To facilitate the interview, a two-page discussion guide was produced (see Attachment D). Each case study interview consisted of four topics selected to draw out the facts about each SHAs maintenance operations-related customer research:

- 1) **Context:** Background information about Customer Surveys related to the state DOT’s highway maintenance operations; political, institutional, or other situational factors of interest; history of conditions influencing the situations and decisions to use customer research.
- 2) **Facts about the case:** Details on the survey(s) including market research methods, design and implementation; data analysis; and strategies to use the data in the planning, budget, or planning/outreach processes. The cost of conducting the research was also sought.
- 3) **Challenges encountered:** Perspectives of the various factors relating to the challenges that emerged and/or obstacles to using the data and how (if) these were overcomes; actions taken; and any changes to the research strategy.

- 4) Outcomes: How the SHA applied customer research; what are the lessons learned; what advice does the SHA have for other organizations.

Case Study Interviews

Of the eight states selected, NuStats completed interviews with representatives from seven states, completing seven case studies. Arizona was selected but chose not to participate due to an internal conflict. Table 5 details the department, survey title, date(s) of survey administration, interviewee name(s), interviewee title(s), and the interview date.

Table 5: Case Study Interviews

State	Department	Survey Title	Date	Interviewee	Title	Interview Date	
AZ	Chose not to participate						
FL	Florida Department of Transportation	Customer Satisfaction Survey	2000, 2002, 2004, 2006, 2007, 2009	Tim Latner	Director of Office of Maintenance	June 2, 2009	
				Monica Zhong	Sr. Policy Analyst, Policy Planning Office	June 2, 2009	
				Steve Liner	Programs Manager, Office of Maintenance	June 2, 2009	
LA	Louisiana Department of Transportation	Business Process Improvement Program Team 9: Customer Input Report	2003	Rhonda Foster	Operations Division – Maintenance Section	June 5, 2009	
				Vincent Latino, Jr.	Engineer Administrator	June 5, 2009	
MD	Maryland Department of Transportation - State Highway Administration	External Customer Survey	2006, 2008	Catherine Rice	Manager of Performance Excellence Division	July 9, 2009	
MN	Minnesota Department of Transportation	Customers and Their Expectations	2004	Chris McMahon	Market Research Director	June 18, 2009	
		Statewide Omnibus Survey	Since 2001				
		MBP Market Research Study (changed to Maintenance Products and Services Performance in 2005)	1994, 1996, 2000, and 2005				Steve Lund
MO	Missouri Department of Transportation	Road Rally	1999	Bill Stone	Organizational Performance Administrator	May 27, 2009	
		Rest Area Comment Cards	2006, 2007, & 2008				
		Transportation Customer Survey	2004				Jim Carney
		Maintenance Performance Indicators Report	2007				
PA	Pennsylvania Department of Transportation	Highway Administration Customer Survey	Annual since 1995	Daryl St. Claire	Maintenance Bureau Director	June 30, 2009	
				Meg Jordan	Business Review and Results Division	July 7, 2009	
WA	Washington State Department of Transportation	Maintenance Customer Survey	1995, 2000, 2005, 2010	Anna Zaharris	MAP Specialist, Maintenance & Operations	July 1, 2009	

Florida DOT Biennial Customer Satisfaction Survey

Context

In 1999, The Florida Department of Transportation (FDOT) reinvigorated its approach to managing the state's highway system by adopting an agency-wide business model, the Sterling Business Model for Organizational Performance of Excellence, which led to focused efforts to consistently engage diverse customer groups through customized qualitative and quantitative research. Since 2000,⁴ FDOT has administered a biennial Statewide Customer Satisfaction Survey to collect customer data on service areas such as highway safety, public transportation, and highway maintenance.⁵ FDOT uses the survey data to develop service improvements that meet customer expectations and satisfaction levels, as well as to measure the performance of their services in fulfilling the agency's mission—to enhance mobility, safety, economic prosperity, and development as well as to maintain the quality of the environment and community.⁶

Implementing the Sterling Business Model provided the foundation FDOT needed to institutionalize customer research within their operations and business practices. Designed to help organizations identify, manage, and exceed stakeholder (e.g., Florida's motoring public) requirements and expectations, the model is based on seven criteria, most notably, "Customer and Market Focus."⁷ Facilitated by the guidelines and directives outlined in the previously identified criterion, FDOT examined how the agency defines customer groups, determines customer needs and expectations, and identifies key factors related to customer satisfaction. Through this process, FDOT developed the groundwork necessary to build a relationship with their customers. As a result, by 1999, consumer research had become part of FDOT's business strategy. This was a critical achievement for securing executive support and project funding, two obstacles that most often deter other state agencies from conducting customer research. With the necessary support and resources available for this research, FDOT now had the ability to consistently administer a statewide survey, allowing them the advantage to track performance levels for highway maintenance services over time.

The statewide survey is successful because FDOT was able to identify customer groups, define performance levels, overcome challenges in reaching these customer groups, and provide the leadership ("champions") necessary to generate insightful outcomes.

Facts

To design the initial questionnaire, the Executive Board identified six customer groups and conducted a series of focus groups to garner their input. The six customer groups identified by FDOT are residential travelers, commercial customers, elected/government officials, visitors, special need customers, and property owners, and provide an accurate representation of the varying perspectives and opinions regarding the state highway system.⁸ But, by what standard would FDOT measure its services? To answer this question, FDOT conducted the focus groups with each customer group in nine separate locations across the state (containing a mix of rural and urban areas). Six focus groups were held at each location. Ultimately, for each operation, FDOT identified an expected level of service, its relative importance to other operations, and a list of improvements needed.⁹ These measurements became the baseline understanding to which the results from the Statewide Customer Survey would be compared. Each year, using results from preceding years as a benchmark, FDOT uses the survey results to justify investment in service improvements.

Consultants at Florida State University (FSU) and the University of Florida (UF), chosen because they provide services for a cost within FDOT's budget, conduct and manage the survey effort for FDOT. The

⁴ The Statewide Customer Satisfaction Survey was administered in 2007 to avoid the 2008 election year; FDOT felt it would get better results this way. The next survey will be administered in 2009.

⁵ Zhong, Monica, Personal Interview, February 5, 2009

⁶ Florida Department of Transportation, <http://www.dot.state.fl.us/planning/customers/>, June, 2009

⁷ Florida Sterling Council, <http://www.floridasterling.com/pdf/08ChallengeBook.pdf>, June 2009

⁸ Zhong, Monica, Personal Interview, February 5, 2009

⁹ Ibid.

UF conducts the telephone surveys of Florida residents and commercial drivers, in English and Spanish. For the Florida resident survey, those who have been addressed in Florida and are over 18 years old are eligible to participate in the survey. For the commercial driver survey, the list is pulled from the state's commercial driver database. Overall, the FDOT obtains feedback from 5,000 respondents for the Florida resident and commercial driver surveys. FSU sends a mailed survey to older Floridians (in English and Spanish) and elected/appointed government officials. The FSU sends advance mailing and forms to Florida customers about the survey, followed by the survey itself and a follow-up questionnaire. For the elected/appointed official survey, all mayors, city managers, county commissioner chairs, county administrators, MPO chairs, MPO staff directors, and state legislators are surveyed. For the well elder survey, 400 completes will be collected.

The UF collects data for the resident and commercial driver surveys and forwards the data to FSU for analysis. The FSU handles data collection of the well elder and government official surveys, analyzes the results of the surveys the UF and the FSU have conducted, and prepares a report for FDOT detailing the survey results, comparing district, statewide, and annual results. The department also partners with Visit Florida to conduct Web-based surveys of U.S. visitors to Florida. Like the well elder survey, 400 completes will be collected. Upon completion, Visit Florida prepares a report with cross tabulations, percentages and mean scores (1-4).

All survey results are analyzed statewide. Results from the Florida resident, commercial driver, and government official surveys are also analyzed by district. Each of the department's seven districts and each service area (e.g., Construction, Pavement Markings) has a "champion" who analyzes the data for their service/district and identifies trends in the data from year to year—what differences in the data can be discovered, how strategies from the previous year can improve services performed, etc. With this focused approach, the "champion" assures that the value extracted from the data is maximized. The Champions Committee then has the opportunity to discuss the findings from each service/district and to prioritize strategies for improvement. In the end, the Champions Committee presents a recommended plan of action for the Executive Board to consider.¹⁰

FDOT was able to secure \$175,000 each fiscal year for the Customer Satisfaction Survey. The entire \$175,000 for the survey is completely state-funded and comes from FDOT's operation budget. The funds are also used to support other departmental survey efforts, such as the 2006 focus group study and the 2009 safety survey.

Challenges

As with most surveys, FDOT is faced with the challenge of obtaining responses from hard-to-reach populations, specifically Florida's younger population. Because the younger population is a large portion of FDOT's customer base and uses FDOT's services extensively, not getting feedback from this populations is a concern for FDOT. To measure the significance of the under-representation, FDOT has asked the FSU to weigh the results of the resident survey by age. It is concluded that no significant difference has yielded from this analysis. FDOT has also tested the use of mail and Web-based methodologies to assess whether they would harvest better representative samples. However, FDOT received lower response rates from younger driver and non-white driver populations. Actually, older white men were oversampled in the pilot test. In conclusion, FDOT is continuing to administer the Florida resident survey via telephone.

Outcomes

After the 2000 Customer Satisfaction Survey, the Customer Satisfaction Survey Champion Committee was established. Action plans were developed across the state and in the districts. The Executive Board designated several areas for improvement. Among them were nighttime visibility of pavement striping and markings, access to business during construction, and timeliness of completing construction projects. These areas, as well as roadside attractiveness and litter-free roadsides, are examples of highway maintenance service areas most applicably affected by survey outcomes. Since 2004, FDOT has

¹⁰ Zhong, Monica, Personal Interview, June 2, 2009

seen a steady increase in satisfaction with “access to businesses during construction,” from 46 percent in 2006 to 58 percent in 2007. After the 2007 statewide survey, in an effort to continually improve their services, the Executive Board decided to raise the performance target for “access to business during construction” from 56 percent to 60 percent.¹¹

In 2006, the FDOT Pavement Marking champion became increasingly concerned with customer satisfaction with statewide pavement markings, which consistently received below average satisfaction scores on two questions in the survey: (a) During the day, visibility of roadway striping and markings is good, and (b) At night, the visibility of roadway striping and marking is good. Despite actions taken to improve pavement marking quality and thus enhance the scores of these questions, there were no improvements in consumer satisfaction. The champion was interested in finding out why consumer satisfaction levels were lagging behind tangible pavement marking improvements such as enhanced reflectivity. To answer this question, FDOT hired a contractor to conduct qualitative research using funds secured through the department’s research fund after a request submitted by the Pavement Marking champion was approved by the Executive Board.

For this qualitative research effort, FDOT administered a paper version of the statewide survey to 150 respondents. Sample was drawn using voting records and stratified to include various age ranges. Respondents then participated in either a cognitive interview or focus group. The cognitive interviews gathered information focused on how respondents interpreted each question. The focus groups consisted of two parts. First, respondents were asked to drive designated road segments and to record their observations. No observations regarding pavement markings were recorded. Second, respondents were shown pictures of road segments that had “good” and “bad” pavement markings. It was not until they were shown various quality markings side-by-side did they notice the difference. It was determined that pavement marking, while important, is not the most critical aspect of the roadway that affects drivers’ sense of control and safety. As seen in the research findings, pavement markings are most often overlooked when drivers are asked about their experiences on roadways through the statewide survey, cognitive interviews, personal observation, or verbal discussion in focus groups. Pavement markings are seen by drivers as either being adequate or not adequate. When asked to rate pavement marking in more detail, rarely would they rate them higher than a three, thus resulting in the consistently low scores of pavement markings. Based on this research, the FDOT has decided to drop nighttime visibility of pavement striping and marking as areas of improvement, but will continue to monitor it closely.

FDOT is always striving to improve the Customer Satisfaction Survey including additional maintenance-related questions to the survey instrument. Over the years, the department’s Customer Survey Champion Committee has proposed a number of changes to the surveys instruments, individual questions, and processes as a whole. As a result of these ongoing modifications, many improvements have been made to increase the accuracy of the measurable outcome levels for department programs and processes.

¹¹ Zhong, Monica, Personal Interview, June 2, 2009

Louisiana Department of Transportation and Development

Context

In 2003, the Louisiana Department of Transportation and Development (DOTD) hired Dye Management, an operations improvement consulting company specializing in transportation, to conduct and evaluate their aging management systems. Designed in the 1970's, the computer systems were not producing the data DOTD needed to accurately track costs and maintenance activities. After an initial efficiency evaluation of the entire department, Dye Management determined the need to create a separate maintenance group supported by a performance-based system using level of service parameters. These parameters were defined by engaging the customers through quantitative and qualitative research methodologies.

Facts

The purpose of the study was to measure the attitudes and opinion of Louisiana residents regarding road maintenance, including their expected level of service for nine maintenance asset types: road surface, shoulder, drainage, roadside, pavement markings, signage, bridges, safety barriers, and rest areas. Information was gathered through a telephone survey and through focus groups. The telephone survey collected information from 401 Louisiana residents who drive at least 20 miles per week in a motor vehicle on Louisiana highways.¹² Sample was drawn using a random digit dialing approach to ensure a randomly selected sample that was representative of the sample universe. Dye Management directed all tasks associated with sampling, data collection, and data analysis efforts. When the sample was studied in total, the overall sampling error was determined to be +/- 5%.

Focus groups were conducted with residents in Baton Rouge and Natchitoches to validate the findings of the telephone survey. Focus groups were selected to be representative geographically and to provide an even balance between urban and rural areas of Louisiana. Participants were selected randomly using the random digit dialing approach. Residents who lived within 50 miles of the selected locations and drove at least 20 miles per week in a motor vehicle on Louisiana highways were eligible for participation.¹³ Overall, two focus groups were held with 18 respondents. At the sessions, respondents were asked to rank perceived and desired conditions for five levels of service for each of the nine maintenance asset types. This exercise was facilitated by a packet that contained written descriptions and photographs of actual highway conditions illustrating each asset type service level.

In preparation for the residential focus groups, an additional focus group was organized with eight DOTD employees to test the discussion guide and overall logistics for the groups.

Outcomes

The general and detailed findings from the study were summarized by Dye Management in a Customer Input Report. General findings included perception of the current level of service and definitions for desired maintenance levels. In addition, detailed findings by asset type compared current perceived conditions to desired conditions. The data were used to develop a performance-based maintenance management system in support of maintenance activities and budget outlines.

¹² Ibid.

¹³ Ibid.

Maryland State Highway Association

Context

Under the broader umbrella of the Maryland State Department of Transportation is the Maryland State Highway Administration (SHA). Ten years ago, the SHA implemented Total Quality Management (TQM). At that point, the agency started conducting external customer satisfaction research. The Maryland SHA quality program underwent changes every few years, evolving as the management industry did. TQM teams worked on projects, and the agency sought more input from lower levels of organization. SHA added more process improvement, including the Continuous Product and Process Improvement (CPPI) consisting of process evaluations and process improvement teams.

In 1997, Maryland adopted Managing for Results legislation. Managing for Results (MFR) was implemented in State government in order to meet the needs of Maryland's customers and stakeholders more effectively and efficiently. Managing for Results is a future-oriented strategic process that emphasizes achieving results that are both meaningful and measurable.

This change required state agencies to submit performance measures along with their budgets. Enacting this new legislation led to a business planning approach agency-wide, including key performance areas, (KPA), such as maintenance, mobility, and environmental stewardship. SHA established councils—essentially groups of people dedicated to making things happen in the key performance areas. The measurement is based on outcomes; for example, is SHA achieving its policy objectives for this key subject area? Traffic safety, pavement, and conditions of bridges are a few objectives that SHA measures.

SHA's Performance Excellence initiative began in 2002 under Administrator Parker Williams and was based on the Malcom-Baldrige Criteria for Performance Excellence. This brought a major change in the quality management approach. In 2004, a new administrator, Neil Pedersen, continued this work by developing an implementation vision and by guiding the agency more heavily into business planning, resulting in a major change to SHA's approach to its Business Plan. This Business Plan puts the value of customer service and customer input on par with other KPAs. The Customer Service, Satisfaction, and Communication KPA has a goal to improve in these three areas. Overall customer satisfaction is the first objective for this KPA.

During all the change and evolution, SHA continued to conduct research. SHA tried several research approaches including a mailout survey and feedback cards placed at rest stops around the state. Institutionally, SHA recognized the need for a consistent and statistically accurate research program. In 2006, the agency began a biennial statewide telephone survey; this approach yields a statistically representative data set of the state overall and at the seven district levels. Prior to moving forward with the research, SHA directed the Schaefer Center to conduct consumer focus groups to ascertain the types of questions that should be in the survey instrument. They also conducted a thorough literature review of other state SHAs to learn about new ideas and best practices for conducting customer survey research.

Facts

Following several years of varied consumer input research, SHA contracted with the Schaefer Center for Public Policy at the University of Baltimore to design and administer a statewide customer survey. The survey yields approximately 2,300 interviews with a margin of error of +/- 2 at the 95% confidence level. The study population is defined as residents of Maryland who have a valid driver's license. The survey budget for this effort is \$100,000.

The main part of the customer satisfaction survey relates back to maintenance: specifically, respondents' experience driving on SHA roads. SHA includes a list of services it provides, e.g., keeping roads in good condition; plowing the roads; how the lines are striped; customer service if they had ever contacted SHA and response from SHA; system preservation; and a few questions about environmental protection, wildflowers, billboards, and roadway safety. For each of the factors or dimensions to be measured, the questions on the survey are phrased in terms of "how important is it" and "how well do we do it." The answers are provided as a list of grades that respondents can assign to that dimension: A, B, C, D, or F. SHA and the Schaefer Center determined that a graded response category would make the most sense to respondents.

The survey was programmed by the Schaefer Center staff using Sawtooth Software's Ci3 Computer Assisted Telephone Interviewing (CATI) software and tested by the Schaefer Center CATI Lab staff. These tests were used to further refine the survey instrument and the CATI programming. Any issues with readability, skip patterns, or survey flow were identified and corrected at this stage. The Schaefer Center conducts a field test of the survey to help identify any issues, concerns or challenges prior to full survey implementation. These challenges can include such things as problems with the sample, issues with respondent comprehension, or major objections from respondents with the survey itself. None of these issues were present during the field test.

Prior to each survey, a committee of about five SHA employees works on revisions to the survey instrument. Changes to the questionnaire are typically minimal and may be based on current initiatives within SHA, customer feedback from the previous survey, and customer issues or complaints.

The survey employs a stratified, random sampling technique based on list-assisted random digit dialing. Each of Maryland's seven SHA districts was sampled independently, using a pool of random numbers that were sufficient to obtain the necessary number of respondents from each district. The sample was designed to achieve a margin of error of +/-5% at the 95% confidence interval for each SHA district and +/-2% at the 95% confidence interval for the state as a whole.

Challenges

One of the major challenges for the Maryland SHA customer survey is gaining cooperation from younger drivers. Response rates are typically low for younger age cohorts. Their current contractor has not developed a method for obtaining participation from cell-only households, which are typically younger.

Another challenge for SHA is that it can be difficult to secure continued funding for the survey. While the agency only conducts the customer survey every other year, the funding comes both from the state and the federal government, and it can be challenging to earmark in annual budgets.

Similar to the Pennsylvania DOT, Maryland's SHA experiences negative comments about roads and bridges they do not own or maintain. One tactic they implemented to overcome this challenge was to include a verbal description of roadways. The respondent also has to provide a road number to ensure it is a valid part of SHA's jurisdiction.

SHA would like to conduct a more detailed customer analysis, but budget limitations prevent this type of in-depth work.

Outcomes

SHA uses the data to determine how to structure maintenance activities in the future, for example, staffing and the specific types of activities that will be needed. The data results help SHA adjust its programs if the data reveals a drastic need to enact a change.

As a result of the survey findings, SHA was able to, for example, funnel money to bridge maintenance.

Some of the lessons observed from the SHA effort include:

- It can be difficult to ask for too much detail on the survey.
- The best roads are invisible.
- Qualitative research helps design the survey instrument and determine the issues to ask.

Minnesota Department of Transportation

Context

The Minnesota Department of Transportation (Mn/DOT) maintenance organization is among the first states to characterize its maintenance activities into customer-driven products and services; it has been conducting customer research for many years, with efforts dating back to the early 1990s. Around that time, in an effort to meet and balance an operating budget, Mn/DOT leadership pursued a strategic management plan to recreate an environment with an ever-increasing business-like operating structure. The plan outlined a number of strategic initiatives and placed significant emphasis on the value of listening to and being responsive to its customers' needs and expectations through customer-based performance measures. By the mid 1990s, the organization formed its own professional research unit to help implement this plan drawing staff experienced in research and conducting customer surveys from the private sector. Mn/DOT's objective was to ensure its market research was grounded with the best of industry practices and that data was (as often as possible) fully representative of external customers (not just the vocal minority that routinely called into the Department or showed up at public meetings). The goal was to ensure that market research data led to influencing decision-making that was responsive to customer needs. Focus of the organization's products and services, in terms of customer expectations, is blended with technical data and strategic planning, and is done whenever fiscally and technically feasible.

Today, Mn/DOT's market research unit provides services and support for over 4,500 employees responsible for a statewide roadway system that includes 12,000 centerline miles, 29,000 lane miles, more than 4,700 bridges, over 130,000 miles of state and local roads, and approximately 200 Mn/DOT truck stations and rest areas. While the majority of research is formulated and designed by the market research unit, it also draws on outside expertise from both private and academic sector-based consultants, for data collection and analysis. The market research staff follows a highly collaborative approach in conducting research and involves their business partners (internal clients) in the research process. For example, at the onset of any research project, they require their clients to define their research needs (informational objectives); they also go one step further by requesting that these business partners determine how the customer data will ultimately be used. By doing this, the research department can assure their clients the research design and survey questions will deliver the data that will meet their needs. This also, and more importantly, prevents using resources for "nice to know" versus "need to know" market research ventures.

Facts

Mn/DOT believes that customer research and maintenance performance measures go hand-in-hand. Within the maintenance program, market research efforts date back to the 1980s, even before their MQA program was in place. To meet the organization's strong emphasis and push for performance-based management, market research was sought and applied to the maintenance operations decision-making—in particular the organization's performance measures and their related targets. The current key maintenance performance measures are striping, signing, bare lane for snow and ice, as well as roadside maintenance (e.g., mowing, weed control, etc). While technical input drives the development of measures, end-users (customers) typically validate the targets. For example, while retro reflectivity may be a performance measure for pavement marking, customer input can be used to define and validate the target for that measure, such as the level of reflectivity (what the public sees).

Developing and monitoring progress in meeting their maintenance performance measure targets are driven by three primary customer survey efforts: (1) The annual Omnibus survey (department wide); (2) Business planning (maintenance overall); and (3) The Bare Lane Study (snow and ice focus). Each is briefly described below.

Omnibus, Department-wide Survey. On a yearly basis since 1987 (with the exception of 2007), Mn/DOT has conducted a department-wide customer survey, with the maintenance office as one of several "clients." This annual Omnibus, as with any other type of omnibus survey, is considered to be a means of keeping a "finger on the pulse" of the public. The 2008 survey included 12 topic areas, including

maintenance. The survey is administered via telephone to a random sample of 800 Minnesota residents with a margin of error of +/- 3.5%. In contrast to the other two surveys performed for the maintenance department, most of the questions in the Omnibus survey query respondents on how well the organization is performing in delivering its products and services, making it difficult (but not impossible) to draw out tactical changes because service issues are not able to be deeply delved into. The survey responses are typically based on a 10-point scale (1=lowest and 10=highest), which enables analysis within three zones: 1-4, 5 and 6, and 7-10. The 2008 survey assessed performance satisfaction in providing seven maintenance services (signs, rest areas, snow and ice, striping, debris, litter, and roadway surface) and overall satisfaction with these services. The 2008 data showed stable ratings or improvements to the historical levels, and all but two scored on the top end of the 10-point scale, failing to reach the target levels of performance. Last year's Omnibus also asked for the lowest rated services, "What could Mn/DOT do to most improve this service?" Cost: \$4,000–\$16,000 per office.

Business Planning: Maintenance Products and Services Study. The business planning survey was first conducted in November 1994 and thereafter in 1996, 2000, and most recently in April 2005. The survey measures importance and satisfaction of its core services and provides the maintenance office with trended customer information to inform service prioritization and resource management. The survey is administered via telephone with a sample size of approximately 1,000 and a margin of error of +/- 3.2%. At the core of the 2005 maintenance business planning survey effort was customer opinion on their desired levels of acceptable performance and their evaluation of current performance (how the organization is doing versus expectations). The data provides a deeper understanding—with more detail on satisfaction, importance, and acceptability regarding how the Mn/DOT's Maintenance Office operates—than the Omnibus study can provide. Results are organized in three key categories:

- 1) Opportunities for improvement (areas rated high in importance and with the largest gap between acceptable performance and actual performance; the organization needs to do better in these areas);
- 2) Areas where needs are met (there is no gap between perceived performance and acceptable performance levels; the organization is doing what the customer expects them to do); and
- 3) Areas where needs are exceeded (perceived performance exceeds the acceptable level/expectations and levels of importance are rated low; the agency may be over-delivering in these areas).

The Mn/DOT maintenance program uses the data to set service and delivery priorities and allocates resources accordingly. For instance, the 2005 study indicated that statewide Mn/DOT customers believed the organization should focus on three key areas—clearing roads of ice and snow, keeping road surfaces smooth and comfortable to drive on, and making road stripes and markings clearly visible. These areas received more funding allocation than any of the other areas included in the study. Cost: \$40,000–\$50,000.

Bare Pavement Survey (Snow and Ice focus). The Bare Pavement Study was first conducted in 1999 to determine if "operational guidelines" for snow removal on Minnesota highways were appropriate for the state drivers. That study led to the determination that drivers were willing to accept a level of snow removal that was less stringent than what had been called for in the guidelines. The definition of "bare pavement" was changed from "fully bare" to "bare between the wheel paths." The study was conducted again in 2007 to determine if this definition was still acceptable to highway drivers. The 2007 study replicated the survey design and administration methods (with slight improvement modification to the sampling frame) of the 1999 study. The survey method utilized videos of five road conditions resulting from a 3" to 4" snowfall on four different roadway types: Interstate, 4-lane divided, and 2-lane in town and out of town. The roadway conditions ranges included: fully bare, bare between the wheel paths, right lane bar; left lane snow covered (Interstate only), one or two intermittent wheel paths, and snow covered and compacted. Survey participants viewed the videos (17 in total) in a centrally located facility and following each video recorded their reactions on self-administered questionnaires. The survey sessions lasted for three hours for about half of the respondents, while the other half only stayed for an hour. (Focus groups were added to the CLT methodology for half of the participants in order to better understand the quantitative data obtained in the survey.) In 2007, a total of 785 interviews were completed with a margin of error of +/- 3.6%. The survey results indicated the current definition of bare

pavement (bare between the wheel paths) was appropriate for all roadway types if it was achieved within 3 hours of the snowfall. After 5 hours, the acceptability level dropped considerably.
Cost: \$100,000.

Challenges

The Mn/DOT market research unit strives to deliver highly reliable and statistically valid data and, over the years, has developed many standard practices in their research designs to ensure that the integrity of their data is not compromised. For example, to ensure that respondents share opinions on Mn/DOT maintained roadways, respondents are reminded at the onset of the survey that the interview questions only address the state DOT-managed roadways and not local or County roads. Respondents are asked which highway or freeway they use most often (using a pre-programmed drop-down list if conducting a telephone survey or post-coding the roadway if a self-administered survey) and to base their responses on that roadway. In this way, the context of the survey (Mn/DOT-maintained roadways) is set.

Providing high quality data in which its clients can trust is a priority for Mn/DOT's market research unit. Many research projects require a quick turn around or come with challenging research objectives, and the researchers must hire a research firm to provide administration of data collection, analysis, and reporting for the survey. A standard practice they follow, working with their contract administration office, is to draw upon a list of pre-certified consultants from which they can select a vendor quickly. Ensuring that their research vendors are technically competent requires setting clear standards of qualifications. Examples include having research experience in transportation and state roadways and being familiar with Minnesota's transportation issues and demonstrating experience in market research methods. Mn/DOT's research Requests for Proposals for surveys follow a standard template to make this selection and hiring process efficient.

Mn/DOT's operating budgets for most departments do not have line items dedicated to customer research. When a client approaches the research department for a research project and does not have the funding to cover the full study, the research unit seeks out opportunities for district offices or various departments with a potential interest in the research topic to contribute any resources with the intent of pooling available resources to support the research. The advantage in using pooled resources is that it can afford a more rigorous research methodology with a greater, more representative sample. Frequently, in their efforts to find departments willing to contribute resources for research that would benefit more than one client, Mn/DOT finds it useful to seek out a champion for the research within the organization. An instrumental step in finding a champion lies in their ability to first convey the need for the research and then the expected value of the research to the organization (e.g., prove how the data will or can be used by the organization in a meaningful, actionable way).

More recently, Mn/DOT is also addressing the public's growing use of cell phones and affinity for the Internet by introducing a cell phone sample to most of its telephone surveys, and is now in the early implementation stage for the use of a Web-based community for some research questions. In both instances, Mn/DOT is following current and evolving best practices within the survey research industry when using these new methods.

Outcomes

Mn/DOT uses customer data from its Statewide Maintenance Products and Service Study to set operational priorities and to allocate resources. Furthermore, when a key maintenance service area is deemed to be an area in need of improvement, survey data are used to justify shifting budgets to address the deficiencies. Mn/DOT has also used survey data to appeal to legislatures for support on issues that are important to their constituency.

Missouri Department of Transportation

Context

The Missouri Department of Transportation (MoDOT) has been a leader in the practice of collecting feedback related to highway maintenance from their customers. Most notably, they collect customer data in a variety of methodologies. In 1998, when the National Cooperative Highway Research Program (NCHRP) began recommending that state agencies conduct customer research, MoDOT implemented an annual statewide customer satisfaction survey into their business practices. Survey topics cover all services provided by MoDOT, including highway maintenance. The most important outcome from the statewide customer satisfaction survey was the Performance Management System, built upon the needs and expectations of respondents to the survey. MoDOT now uses the Performance Measurement System to track maintenance operations performance and to forecast resource and budgetary needs. In addition, they distribute satisfaction comment cards to customers of their commuter lots and rest areas. To fund these research activities, MoDOT utilizes a unique financial structure that provides all monies generated by the gas tax directly to the State of Missouri “road fund” controlled by MoDOT. As a result, MoDOT is able to overcome the greatest challenge to conducting customer research, funding.

Facts

As previously mentioned, MoDOT primarily uses three methods to conduct customer research related to highway maintenance; a statewide customer satisfaction survey, commuter lot comment cards, and rest area comment cards.

Currently, the annual statewide survey is contracted under a three year agreement with ETC Institute in the Kansas City area. Every three years proposals are evaluated on price to assure they do not exceed their budget of \$225,000. The statewide survey costs roughly \$75,000 a year to conduct. The target number of completed statewide surveys is 3, 500 with each of the 10 districts providing 350 completed surveys. All survey responses are collected via telephone. The sampling frame utilizes a landline base sample, with an increasing proportion of cell phone sample to account for the growing cell phone population. In addition, the ETC Institute conducts an annual “Road Rally” where respondents are actually driven on selected roadways and asked to provide feedback on road conditions, maintenance issues, etc.

The commuter lot survey tracks customer satisfaction throughout the state on issues such as cleanliness, safety, and parking availability. Overall, there are 110 commuter lots under MoDOT’s jurisdiction. Twenty commuter lots are selected annually for survey administration. Fifteen of the same commuter lots are selected each year, while the remaining five commuter lots are selected at random. This selection methodology ensures the most heavily used lots and rural lots are targeted. Each survey consists of six questions. On average, 1000 surveys are handed out and 300 completed surveys are submitted. Surveys costs are minimal because the survey is designed, managed, and administered by MoDOT staff. MoDOT employees are responsible for questionnaire design, printing the surveys, fieldwork, and analysis.

Rest area comment cards are present in boxes at each location. Respondents can easily access the cards, fill one out, and then drop it into the drop-box where they are retrieved by MoDOT employees. The comment cards can also be mailed directly to MoDOT. On average, 8,000 to 9,000 rest area comment cards are received annual. Similar to the commuter lot customer satisfaction survey, the rest area comment cards are designed, administered and analyzed by MoDOT staff. Data inputting is done by the executive assistant, who spends one-third of her time on that task. They compile the data into a master excel spreadsheet for the performance measurement evaluation team to analyze.

Challenges

MoDOT has faced a number of challenges since they began collecting customer satisfaction data related to highway maintenance:

- 1) **Sampling:** Districts do not find the sampling method for the commuter lots especially helpful when evaluation the performance of their commuter lots. Each district would like to see site specific data on each commuter lot in their district rather than the trends of the entire state. They want to know, “what is the dirtiest commuter lot in our district?” or “what is the most unsafe commuter lot in our district?” While MoDOT is unable to survey each lot they make their materials available for individual districts to incorporate into their operations if they so choose.
- 2) **(Non) Response Bias:** The respondents who participate in the commuter lot and rest stop surveys are those who use these services. While MoDOT is able to accurately capture data from the direct users they fail to collected feedback from potential users and/or non-users to investigate why they are not using the commuter lots and rest areas. Data from this population could help further improve these facilities and expand the number of residents they services. MoDOT is currently looking into a Web-based survey option that can reach a wider audience. Additionally, when MoDOT intercepted potential respondents they received a higher satisfaction rate then when they relied on respondents to participate unsolicited. Typically, a respondent won’t fill out a card unless they have a complaint.
- 3) **Data Analysis:** Given the size of the dataset, breaking down the data by district and determining how statistically valid the data are. MoDOT does not have any trained surveyors on staff and is lacking in technical expertise needed to perform more of the work in-house and contract out less tasks.
- 4) **Benchmarking:** MoDOT typically benchmarks their survey results with other state’s results in order to compare themselves with the best. However, in attempting to partner with state agencies, it is a struggle to quantify the value gained from the customer research conducted.

Outcomes

MoDOT used the customer data from the commuter lots to make a case for installing security cameras. Every quarter the performance measurement evaluation team reviews the survey results and presents them to management. The results indicated that customer satisfaction with the safety of certain commuter lots was less than it was the year before. Having data that illustrated safety concerns at commuter lots was all the information management needed to invest in improving safety. This process allows MoDOT to collect data, share results, and use them to make business decisions moving forward. An additional outcome resulted in a commuter lot being repaved given decreased customer satisfaction with commuter lot conditions. The Director of MoDOT has a personal interest in keeping rest stops clean, so the survey team identifies which rest areas are being reported as dirty. Those locations that are determined to be below acceptable cleanliness standards are flagged and brought to the attention of the engineers and their staff to get them cleaned up or fixed.

Pennsylvania Department of Transportation

Context

The Pennsylvania Department of Transportation (PennDOT) has long been a leader among state transportation departments in the area of quality improvement and customer service. In 1995, the Pennsylvania Department of Transportation (PennDOT) conducted the first of what would become an annual study on customer satisfaction relative to maintenance service. At that time, the survey was primarily geared toward maintenance and servicing the roadways. PennDOT districts used this customer service index to prioritize upgrades and repairs to roadways and to provide better service as needed.

In 1999, PennDOT conducted a new research project to gain customer insight and input on ride quality, roadway safety, and traffic flow. The agency conducted two focus groups and an in-depth telephone survey in eight of the state's districts to ascertain the dimensions that were most important to its customers. The goal of the research was to better understand what the public wants to know—what issues are most important to them.

Beginning in 2001, and based on the results of the 1999 research effort, PennDOT overhauled its annual survey of automobile drivers to solicit more detailed and usable feedback to improve the delivery of highway maintenance services at the district and county levels. The initial findings resulted in substantial variation in motorists' ratings among the three classes of highway and from county to county across the Commonwealth.

The annual spring survey is managed by the Business Review and Results Office of PennDOT, but the survey administration—with the exception of the physical mailing—is contracted out to a consulting firm. In the fall of 2007, PennDOT conducted a mini-version of the annual spring survey in the fall of that year to ascertain any seasonal variance in the study results. The prevailing hypothesis was that lower scores may be due to customers having negative recent memories of winter roadway issues, such as plowing and de-icing, dangerous road conditions during inclement weather, or something similar. The analysis and comparison of spring data indicated no significant differences between the two data collection periods.

As recently as 2008, Pennsylvania motorists gave PennDOT highways a grade of C+, which represents a passing grade but leaves room for improvement. Each of the state's 67 districts receives the survey results in the form of a "report card" displaying performance grades in the following dimensions: ride quality, traffic flow, and roadway safety. With these results, the districts set targets for improvement on each survey item that is linked to a strategic focus area of the annual business plans of both PennDOT and the district, thus building motorist satisfaction into the overall work program. In addition, county maintenance offices receive a report card on items within their span of control. They too use the results to influence county maintenance work plans and to establish their business plans. The survey is used internally and not disseminated to the public.

Facts

The PennDOT Highway Administration Customer Survey began in the late 1990s as part of the need to prepare updated business plans for PennDOT. Following a directive from the Pennsylvania Transportation Secretary to be more customer-friendly, the agency sought input from customers. PennDOT chose an annual survey as the method by which they would collect opinions and feedback on how they were doing as an agency.

The Highway Administration Customer Survey (HACS) polls 1,000 people in each of Pennsylvania's 67 counties on ride quality, safety, etc., pertaining to Interstates, state system, and local roads. The survey employs a mail out/mail back method. About 80 percent of questions in the survey instrument are "core" questions that have been ongoing since the study's inception. The subcontractor handles all survey administration, with the exception of the mailout. PennDOT mails one letter; no follow-up or reminders are mailed. The survey achieves a response rate of approximately 17 percent.

The sample currently comes from a random pull from the state's Department of Motor Vehicles (DMV) records of Pennsylvania residents with valid driver's licenses. PennDOT mails out approximately 67,000 letters inviting residents to participate in the survey. In 2006, PennDOT took its consultant's suggestion to purchase sample from the postal service. While it contains all mailing addresses in the United States, it does not contain names. The survey invitation letters mailed that year used a greeting of "Dear Resident." The response rate went from an average of 22 percent in the two previous studies to 10 percent that year. PennDOT attributes the decline to the lack of personalization on the survey invitation letter. The agency elected to return to using DMV records for the survey sample list.

PennDOT employs two methods to increase responsiveness to their resident mail survey. One is to include a county map to aid in completing the survey. The second is to personalize letters that are mailed with the surveys. These personalized letters aim to make customers feel less like a number and more like PennDOT values their personal opinions, increasing the likelihood that customers will respond. A third element, while not necessarily directly related to response rates, is the inclusion of a comment postcard that is mailed along with the survey packet. PennDOT receives back approximately 400 of the comment cards; individual district managers are encouraged to respond directly to customers who write about problems, issues, or complaints with the roadways.

The current survey, managed by the Business Review and Results Office, is not exclusively a maintenance survey. However, maintenance-related questions comprise a large part of the survey. The bureaus within PennDOT's Highway Administration Deputate that contribute to the survey include Design, Maintenance and Operations, Highway Safety and Traffic Engineering, and Construction and Materials.

All bureaus within PennDOT's Highway Administration Deputate provide input each year on the questionnaire design to ensure the survey asks the right questions based on what is going on in PennDOT that year. For example, recently the survey asked more about measuring congestion. It also asks questions about how well the agency provides winter services (such as salting and plowing the state-run roadways).

Challenges

One problem PennDOT has found with the survey is that some Pennsylvanians "blame" poor maintenance/service on PennDOT for non-PennDOT roads. Customers are confused or unaware that some roads are maintained by townships, municipalities, etc. The survey mailing includes a map for the county in which each person in the sample resides; however, some are still confused by which agency is responsible for managing the maintenance of roads in that area.

Outcomes

The Bureau of Maintenance and Operations uses the data internally to make improvements, but occasionally they have to justify a need to receive additional funding; in that case, PennDOT shows the legislature the data. The final results provide a scorecard of how well PennDOT is doing. Currently, they have a C+/B-.

PennDOT survey leaders caution other SHAs to not expect a lot of changes in public perception, and to be prepared to wait for several survey cycles to change public opinion and perception. Another word of advice was to focus on addressing those things within the agency's control; meaning, areas of improvement that individual districts could reasonably enact.

Washington Department of Transportation

Context

In 1996, The Washington State Department of Transportation (WSDOT) conducted its first customer-centric survey of maintenance operations as part of developing the Maintenance Accountability Process (MAP), which has origins in the 1995 Washington legislative session. During the 1995 session, the Washington legislature requested that WSDOT develop a standardized data collection and reporting methodology with a focus on agency accountability. MAP is designed to provide guidance to maintenance personnel and legislators about WSDOT maintenance priorities, goals, and outcomes. The WSDOT Maintenance Customer Survey is conducted every five years to better inform MAP about the priorities of customers and degrees of customer satisfaction with WSDOT maintenance performance. WSDOT uses the survey data to measure the performance of their services in addressing the maintenance priorities of the driving population of Washington and providing road quality that meets customer level of service (LOS) expectations. The legislature uses survey data to evaluate WSDOT maintenance LOS relative to benchmarks developed by customers (Washington residents). From an institutional perspective, the survey is designed to meet WSDOT's strategic objective: "Seek and use customer feedback to improve functional and regional delivery of services to bring services closer to the customers." The survey was conducted in 1996, 2000, 2005, and is planned for 2010 and every five years going forward.

MAP is at the core of WSDOT efforts to institutionalize customer research within their operations, and the primary means of collecting customer feedback for incorporation into the MAP is the Maintenance Customer Survey. Customer service feedback from the Maintenance Customer Survey is combined with technical data from WSDOT engineering and maintenance personnel in the development of the overall MAP, which guides maintenance work priorities and legislative decision making on maintenance budgets. The MAP system, supported by the Maintenance Customer Survey has by all accounts proved its utility to WSDOT personnel, the driving public in Washington, and the state legislature. The success of MAP and the Maintenance Customer Survey can be traced to a collaborative research approach involving both WSDOT maintenance staff and research professionals from the firm contracted to conduct the study. Mostly importantly, MAP has been successful because WSDOT personnel treat the research as a tool for internal benchmarking, collecting feedback, and presenting their accomplishments as an organization. As a WSDOT representative explained, "MAP allows us to document what we do and tell our story. It lets us put our work in front of the legislature and helps them understand how our resources are used."

Facts

To design the initial questionnaire, the WSDOT maintenance staff worked in collaboration with research staff at Dye Management Group. Every five years, as the survey is conducted, WSDOT and Dye Management Group revisit the questionnaire to determine if any revisions are necessary or if improvements can be made, based on changes in the driving landscape or the quality of data captured from previous surveys. Upon development of a draft version of the survey, it is pre-tested among a group of approximately 20 Washington motorists, and revisions are made as needed. Upon development of the MAP in 1996, plans were in place for in-person focus groups to supplement the Maintenance Customer Survey, but these were abandoned after the focus groups were very poorly attended. Dye Management Group was selected as a research partner based on the strength of the proposal submitted to an initial RFP.

The overall survey population for the Maintenance Customer Survey is Washington state residents who drive more than 50 miles per week on state highways. This overall population is then stratified into three geographic areas—eastern, western non-urban, and western urban. The survey relies on purchased RDD (in 2005, N=11,374 and a margin of error of +/- 0.9%) to serve as a sampling frame for a disproportionate stratified random sample (stratified by geographic area). For 2005, once geographic stratification was complete, the sample consisted of 802 Washington drivers. The survey is conducted by Dye Management Group using CATI technology. Up to six call attempts are made at varying days and times in an attempt to reach the potential respondent. In 2005, the survey achieved a response rate of 19 percent.

WSDOT uses the Maintenance Customer Survey both to establish customer priorities and expected levels of service and to rate the maintenance department's performance relative to those priorities and expected levels of service. As the surveys are conducted regularly every five years, they serve as a tool to measure any shifts in the priorities of customers in addition to a longitudinal measurement of WSDOT performance. Finally, the survey results are used to develop best practices. As significant increases in customer satisfaction are noticed for specific maintenance areas in specific geographic areas, the maintenance changes implemented in these instances are considered for inclusion in a set of best practices.

Survey results are analyzed using standard statistical methods on both the entire survey respondent population and the respondents from each of the three geographic regions. Results are presented in a standard report format and available to WSDOT staff and the Washington legislature. The Maintenance Customer Survey is funded entirely through state mechanisms and is earmarked as part of the operating budget of the WSDOT maintenance program.

Challenges

A core challenge of the Maintenance Customer Survey is incorporating it effectively within the overall MAP framework, particularly with respect to determining on which topics maintenance customers are able to provide informed, useful feedback. The typical maintenance customer does not hold the technical expertise necessary to comment on items such as bridge, tunnel, or aqueduct maintenance needs, yet WSDOT will sometimes receive feedback on these facilities. Generally, customer feedback on large pieces of roadway infrastructure reflects the state of public debate within the press over funding maintenance or replacement of said infrastructure, rather than useful feedback on customer experience using the infrastructure. WSDOT has worked hard to present the results of the Maintenance Customer Survey in ways that focus on areas that customers are best able to provide productive feedback (such as roadway striping) rather than areas where customers lack requisite technical expertise (such as the structural soundness of large pieces of roadway infrastructure).

While WSDOT has not experienced any significant difficulty reaching a representative population using only CATI survey administration methods, staff recognizes that changes in technology and communications will encourage administration of the survey using other methods, such as web surveys and using cell phone inclusive RDD.

Outcomes

The results of the Maintenance Customer Survey, as incorporated into MAP, are primarily used to identify expected LOS among maintenance customers, maintenance department success or failure to meet those LOS, best practices for improving maintenance services, and to support maintenance department budgets. WSDOT staff report that each year the survey has met these objectives, and support for the survey remains strong among both WSDOT personnel and the Washington legislature. For example, if customer survey data indicates customer dissatisfaction with the results of a particular maintenance activity, the maintenance department can request additional funding from the legislature to enhance the maintenance activities in this particular activity. The Maintenance Customer Survey, as a component of MAP, allows the maintenance department to supplement professional judgment about priorities and effectiveness with customer feedback rooted in a scientifically sound survey.

4. Guidelines of Good Practice

Putting customer research into practice requires considering the life-cycle of a research effort. This includes the upfront budgeting and planning for research, the design and administration of research, the analysis and interpretation of data and applying it to a program, and using the customer data for eventual benefit of the research sponsor (e.g., secure additional funding for needed improvements, justify budgets and programs, identify where program priorities align with customers, etc.). In this chapter, a set of guidelines of good practice are presented; they were drawn from the information collected and reviewed for this project and presented in previous chapters. Also presented in this chapter is a set of tools, contained in a companion Volume to this report, which SHAs can turn to in planning and conducting customer research.

Guidelines of Good Practice

The following seven guidelines for putting customer research into practice were drawn from the many insights captured during this review of the research practices being conducted by SHA maintenance organizations. These were largely drawn from the case studies introduced in the previous chapter. The guidelines address many of the challenges SHAs that were shared at the onset of the project in the interviews with maintenance organization practitioners, including capacity, cost, and using customer data. They include:

- 1) Have a clear understanding of the research need prior to conducting customer research.
- 2) Partner with internal research experts or seek out a qualified consultant.
- 3) Find a “research champion” within your organization.
- 4) Match your research needs to the appropriate survey method.
- 5) Target the right customer segment to meet the research objectives.
- 6) Consider detailed customer segmentation for more specific customer insights.
- 7) Apply customer research to organizational business planning and decision-making.

State agencies should consider these guidelines to jump-start or enhance their own research opportunities in support of their highway maintenance operations. Agencies with existing research programs can use this information to bolster their current capabilities or to expand the depth of their research. Those without customer research already in place may be able to use these guidelines to help sell the value of customer research to their leadership by conveying the benefits such research would bring to their programmatic and operational decision-making.

Some of the following guidelines are presented in question format that, when answered, can guide research planning to ensure that quality data is produced. Others are larger ideas that illustrate how customer research data can be instrumental in influencing a department’s business practices or business model. Again, while many of these guidelines of good practice are broad in context, SHAs are encouraged to supplement them with the resources recommended in the previous section and summaries of customer research presented in this report.

Have a clear understanding of the research need prior to conducting customer research.

Have a clear understanding of why you need to conduct the customer research before planning begins. This requires defining the purpose of the customer research and how the data will ultimately serve organizational decision-making. Answers to the following questions can help shape the scope and motivations for planning and implementing the research effort.

- What business or operational decision will the data inform? What business dilemma is facing your organization?
- What data do you need to inform this decision?
- How will the data be analyzed?
- Who is the audience that can provide relevant and meaningful data?

After determining the goals of a research project, knowing how you plan to use the results will align your research with the most-effective customer groups to survey.

Cases in Point: The Mn/DOT market research unit frequently solicits research partners for some studies, including its annual Department-wide Survey. Other times, departments within the organization approach the market research unit with a research study. Before initiating any planning or design for the research, the department requires their internal client to clearly define: (1) the research objective; (2) from whom they need to get data or insights; and (3) how they plan on using the data. Once Mn/DOT has this information, the research team can move forward with planning and design for the study.

For example, in 2007, Mn/DOT conducted the maintenance organization’s Bare Pavement Study in 2007 with the objective of determining whether the snow and ice performance measure and targets established in 1999 were still relevant to the State’s drivers. The key research questions were stated as:

- 1) To determine if the “bare between the wheel paths” still meets drivers’ expectations.
- 2) To help Mn/DOT understand how drivers differed in 1999 on what they “expected” and what they identified as “acceptable” and why, and to determine if these differences exist in 2007 as well.
- 3) To determine the levels of acceptability for several driving scenarios on: 4-lane divided highways, Interstate highways, 2-lane town highways, and 2-lane non-town highways.
- 4) To determine if there are differing expectations for snow removal on 4-lane divided highways versus the Interstates.

Finally, the maintenance program made it clear that they would use the data, among other things, to validate whether or not the level of service targets for bare pavement was still an accurate reflection of drivers’ expectations. With the upfront research needs clearly defined, the research department was able to move forward with the design for the research study.

Partner with an in-house survey expert, qualified consultant, or SHA peer

Some SHAs such as Mn/DOT and PennDOT are fortunate to have internal research departments staffed with experts in customer and survey research. Organizations without this internal resource do have other options for securing survey expertise. While there are resources available on conducting customer surveys (such as NCHRP Report 511), some organizations have a customer or market research specialist who resides in other departments. Some SHAs create a research team that draws from other department expertise. If no such person exists within an organization, hire a qualified consultant or partner with a college/university and draw from experiences of other SHAs who have conducted similar studies. For instance, the Iowa Department of Transportation designed and administered two surveys internally, drawing from maintenance division staff and a technical lead for survey design within another division. This planning team researched methodologies used by Minnesota and Wisconsin for their survey design.

Case in Point: Nebraska Department of Roads (NDOR) conducts an “omnibus” Resident Satisfaction Survey that measures satisfaction with the organization’s overall performance and includes one or more questions on maintenance. The organization uses a combination of a multi-functional team and University consultant to conduct the survey. A committee comprising NDOR Planning Division staff and NDOR Director and Deputy Directors develops and monitors the survey questions. The survey is administered by the Bureau of Sociological Research at the University of Nebraska-Lincoln who collects and compiles the data and provides a raw data file for analysis. The data is then analyzed by NDOR planning staff and summarized in a written report distributed by planning staff. The organization

compiles the survey results into a report that is distributed to the organization’s Management (Directors office, Division Heads, and District Engineers).

Find or designate a “Research Champion” within the division, department, or organization

Most SHAs have dedicated or line item budgets to support research and often need to defend or justify the costs or benefits of conducting customer research. Having a “Research Champion” can benefit your research objectives in several ways. Identifying a Research Champion at the onset of a research study can help promote research needs to garner support, such as securing approval or funding to conduct the research. The Champion can work to sell the idea to Executives by showing a need for the research and the opportunity the research provides. The Champion can also rally support from other divisions or departments. The more support that can be mustered within the agency, the more likely the project will be funded. Assigning a Research Champion to participate on the research team is also useful. This person can carry the torch following analysis of the data to ensure that the value of the research findings is maximized.

Cases in Point: Historically, the Tennessee Department of Transportation (TDOT) Executive staff has gathered customer information from the public in the past and has given it to the Maintenance Division. Recent concerns, especially given the current economic situation, are costs—what are the benefits of the data vs. the costs? TDOT believes that having a “champion” from the organization’s strategic planning department or customer services department is the best strategy to sell the value and gain resource support from leadership to conduct routine customer data collection.

In conducting its Statewide Customer Satisfaction Survey, FDOT designates a research champion for each service area (e.g., pavement markings, construction) who analyzes the data for their area and identifies the trends in the data from year to year. These persons form a Champions Committee, which then has the opportunity to present/discuss findings with each service area/district and to prioritize strategies for improvements. The Champion Committee then presents a recommended plan of action for the Executive Board to consider. Following the 2006 survey, the Pavement Marking champion became concerned with customer satisfaction ratings despite tangible improvements (e.g., enhanced reflectivity) had been made. The Executive Board approved funding to support an extensive qualitative research effort to hone-in on this unexplained gap in ratings. This funding provided substantial insight on how drivers perceive pavement markings, and the survey question corresponding with this area was modified accordingly.

Match your customer research needs to the appropriate survey methods

Quantitative options include survey (telephone, mail, online), comment cards, or fieldwork intercepts. Qualitative options include focus groups or in-depth interviews. Each methodology, when conducted appropriately, can most effectively be used for the following purposes:

Quantitative Research Purposes	Qualitative Research Purposes
Rank or rate product or service satisfaction, expectations, and importance	Exploration of inconclusive survey findings
Benchmarking	In-depth analysis of audience opinions and experiences
Trending or comparing performance results over time	Real-time reaction to materials
Expanding findings to the entire population or target audience	

The most prevalent research method observed used by most SHAs in conducting customer research is the telephone survey, followed by self-administered or mail survey format. The sampling method used most frequently is random sample. NCHRP 08-36, Task 74 and NCHRP Report 511 provide substantial guidance on these types of research methods.

Case in point: TDOT conducted its first Statewide Customer Satisfaction Survey in 2006; the survey itself was customized to include three major components, or three customer groups surveyed by three different methods. Firstly, TDOT conducted interviews with external stakeholders and TDOT managers, and these interviews drove Phase 2 of the survey—focus groups and resident surveys. Focus groups were held with 200 community leaders, including local officials, city and county staff, business leaders, transit operators, chamber officials, airport managers, utility representatives, representatives of non-profit organizations, among others. Furthermore, these focus groups were held in four regions across the state. TDOT also randomly selected 102 residents throughout the state for interviews, 25 of which were held in each of the four districts. By thus segmenting customer groups and by reaching out to them in different ways, TDOT was able to establish an in-depth understanding of expectations for improvements across a variety of customer groups. By targeting the customer groups with an appropriate methodology, TDOT ensured more manageable and realistic research outcomes.

Target the right customers to meet the research objectives

Securing reliable and valid data to inform maintenance operations through customer satisfaction surveys requires identifying the customers or groups whose opinions will be imperative in informing maintenance operations. In other words, whose opinion matters? Whose feedback will inform your decision? Input from these groups will help in determining maintenance priorities, budget, and future planning.

Depending on the purpose of the study, customer groups can be broad in range (e.g., residents) or more limited in scope (e.g., elected officials). Understanding what it is you need to know from your customers will determine whom you need to engage. A larger focus will necessitate a larger customer base. If, for example, you would like to know how drivers perceive road conditions on major interstate highways, then seek opinions from residents, as well as travelers, or commercial vehicle operators. Likewise, a more narrow focus will require feedback from a more limited group of customers; for example, obtaining input on roadway striping would require pinning customers in areas of the state where new striping was recently applied. In this case, a regional customer group would provide more informed feedback than the broader, statewide customer group. For example:

- Broadly defined customer groups include active voters, customer constituent groups, households, winter residents, statewide residents, residents aged 18 and older, and licensed drivers.
- More specifically-defined customer groups include commercial drivers, local Government officials, statewide residents who have driven 20 miles on state highways in the past month, licensed drivers over the age of 18.

Case in Point: The South Dakota Department of Transportation (SDDOT) conducted its 2002 Customer Satisfaction Survey, the third in a series that assessed the needs and attitudes of SDDOT customers.

- Goals of the research project were to (1) assess the opinions of the public and key customer groups regarding the composition, importance, and quality of the Department of Transportations, and key products and services; (2) assess the Department's progress in addressing customer concerns through development and execution of its strategic plan; and (3) identify specific actions the Department can take to improve its performance and its perceptions by the public and key customer groups regarding that performance.
- Key questions asked to determine customer segments:
 - ✓ Have perceptions of the Department's performance changed significantly? If so, how?
 - ✓ How has the Department responded to issues raised in the prior surveys? Have the responses been effective? Are more proactive or effective responses possible?
 - ✓ Do key customer segments—such as emergency vehicle operators, commercial truckers, the agricultural industry, tourists, and others—perceive the Department's services and performance differently from the population at large? If so, how does the Department need to respond to differing end user needs?
 - ✓ Do public perceptions accurately distinguish between services provided by the Department or Transportation and services provided by other public and private entities?

- ✓ Have new issues emerged that are important to the legislature, the general public, or key customer segments?
- ✓ How best can the SDDOT respond to diverse and unique customer needs while still maintaining a high level of quality service to the public at large?
- From these questions, SDDOT determined primary user groups:
 - ✓ Citizens – people who have lived in South Dakota six or more months;
 - ✓ Leisure travelers – people who have traveled by car 75 miles or more from home on a trip for leisure purposes and stayed at least one night away from home on the trip;
 - ✓ Farmers – people for whom agriculture has been their primary occupation for a year or more and currently active in agriculture;
 - ✓ Emergency vehicle operators – people who currently drive an emergency vehicle and who have driven an emergency vehicle for six or more months;
 - ✓ Carriers/Shippers – people who currently drive a commercial vehicle to haul goods or freight, or companies who ship goods or freight by truck only;
 - ✓ Legislators – Legislators were again surveyed as in 1999, and treated as a sixth customer segment. They evaluated the same set of products and services viewed as important to citizens.¹⁴

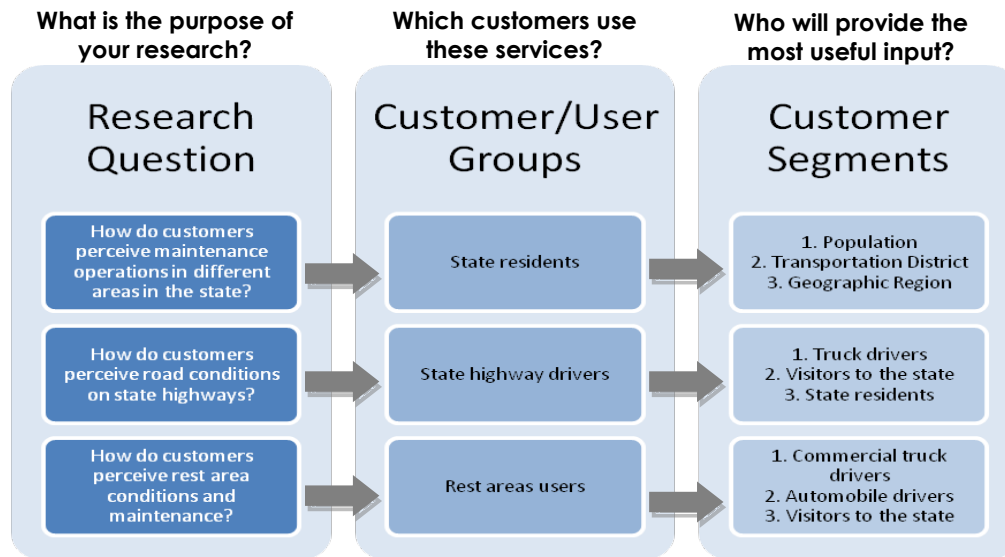
The list of key questions is extensive, but was necessary in determining SDDOT's six key customer groups. While these customer groups were sufficient for SDDOT's research needs, some transportation agencies will break these groups into more selective groups, often smaller, whose focus is more specific. These customer segments provide more meaningful feedback as customers in these groups are closer to the issues and are better able to comment significantly on performance measures.

Consider customer segmentation for more specific customer insight

Customer groups can be further broken down into in a variety of segments based on demographics, geography, region, etc. There are different ways to look at stratification related to roads, and for maintenance operations, this is key—knowing those who use the services you provide, e.g., automobile/truck drivers, as well as where and when they use those services; where those services are used the most, the least, or not at all; specific times of the year when services will be more relied upon than others; those who use services but not a regular basis, etc. Typography, weather, road conditions based upon weather throughout the state/area, more heavily populated cities versus lesser populated rural areas—these all factor into maintenance operations, priorities, and planning for future operations.

Primary customer groups can be segmented into smaller customer groups by: county, geographic region, climatological regions, travel mode, rural vs. urban, transportation district, customer interaction with the agency, and customer type (e.g., government officials, commercial truck drivers, senior citizens, emergency vehicle operators, farmers, motorists at rest stops). The following figure illustrates the questions an organization may consider when trying to define a target customer segment for its research focus.

¹⁴ Bender, D. and J. Schamber. *SDDOT 2002 Statewide Customer Satisfaction Assessment*. Final Report, Study SD2002-07. South Dakota Department of Transportation, December 2002.



While surveying customers based on more detailed segmentation may be attractive, the costs of doing so may be restrictive to some organizations. The benefit of incorporating customer segmentation into a survey is to obtain meaningful data from each of the customer groups. This requires collecting enough survey data from each of the customer segments to enable analysis that results in statistically reliable data.

Case in Point: Stratifying customer groups by regional populations can provide representative data to prioritize maintenance operations. The Washington Department of Transportation (WDOT) conducts a biennial Maintenance Customer Survey and stratifies their customer group—Washington residents who drive 50 miles or more a week on state highways—into three geographic regions ensuring a sufficient number of respondents from each area. Eight-hundred and two drivers are surveyed in the three following areas: 1) “Western non-urban,” which comprises 16 counties, 2) “Eastern,” comprising 20 counties, and 3) “Western urban,” comprising three counties. Obtaining equal samples from each region ensures a statewide representation of all Washington residents.

In another example, the Wisconsin Department of Transportation (WisDOT) conducted its 2004 Customer Satisfaction Survey, of which Wisconsin residents were determined as the primary customer group. WisDOT further segmented this group into six very specific customer groups, each having different interactions with WisDOT and providing WisDOT with a unique insight into and a better understanding of a variety of customers. WisDOT’s six customer groups for the 2004 study included:

- DMV in Person – these customers went to the DMV office in person, for any reason.
- DMV by Phone, Mail, or Online – these customers had done business with or got information from the DMV by phone, by mail, or at its website.
- Traffic and Road Construction – these customers encountered road construction or a major maintenance project on a Wisconsin state highway.
- State Highway Operations – these customers had driven on Wisconsin state highways, but had no other recent interactions with WisDOT.
- State Patrol – these customers were stopped for a traffic violation by the Wisconsin State Patrol.
- People Impacted by Highway Construction – these customers’ property, town, or neighborhood was affected by construction or expansion of a state highway or interstate.

WisDOT’s goal was to survey as many different customer groups as was economically possible and to reach enough customers per group to adequately reflect the entire customer population. Segmenting customer groups into how they interact with the agency led to survey results that set a benchmark for an ongoing process of seeking out customer feedback.

Apply consumer research data to organizational business planning and decision-making

Completing the life-cycle of customer research means that the findings and data are put to use for an organization's benefit. While, by far, most SHAs are using customer input to monitor customer satisfaction, some have used customer data more constructively than others. The Florida Department of Transportation (FDOT) used this strategy successfully through an agency-wide commitment to connect with their customers. By developing a business plan that integrated consumer research into their process for conducting business, FDOT was able to overcome two significant barriers to conducting customer research: executive support and funding.

Cases in Point: As shown in the following examples, customer research data use ranges from using the data to develop performance measures to using it as a basis to justify the budget for a needed process improvement.

- California DOT customer surveys validated the agency's belief that the public's maintenance priorities were the same: safety, preservation, and service. It did identify some safety areas that needed improvement, which resulted in these items receiving special focus in the Department's strategic plan. As a result, some maintenance funding was reallocated to address these safety improvements.
- Iowa DOT has conducted two surveys (2002 winter services and 2006 general maintenance), which collected data on Importance versus Performance allowing the agency to conduct a "gap analysis" and identify items that were of high importance to residents, but that Iowa DOT was performing poorly. This led to assignments for each maintenance division.
- Louisiana is using their customer data in their current budget meetings with the state legislature.
- North Dakota DOT's Customer Satisfaction Survey (contains one or more questions on maintenance, but assesses the organization's overall performance) is used to help justify budgets and personnel resources. It provides information on when a certain maintenance operation needs more funding or manpower.
- Virginia DOT is using the latest Dashboard survey to evaluate investments and plan strategies for future investments.
- Washington DOT uses their Maintenance Customer Survey data in conjunction with the Maintenance Accountability Process to assess whether performance measures are aligned with customer expectation. While the customer survey data helps the state identify program priorities, it does not affect budget allocation decisions. Washington DOT also conducts a Rest Area Customer Survey and follows up with negative comments, but also uses survey results to affect allocation decisions within the rest area realm only.

Resources to Assist SHAs

In addition to the information compiled in this report, several tools and resources SHAs may find particularly useful in guiding their future research efforts are contained in Volume 2. These include:

- A **bibliography** of the resources collected and reviewed during the literature review that were most relevant to this topic (see Chapter 2 of this report).
- Examples of **customer research surveys** that are either (1) focused purely on maintenance operations or (2) contain one or more questions on maintenance operations and are part of an Agency-wide or Omnibus survey effort.
- An **item pool of survey questions** that were drawn from the surveys included as examples in this Volume. These are provided so that SHAs can draw from an array of questions that have been used by SHAs in the past five years to gather information from customers on their satisfaction and importance levels with maintenance operations and overall performance, comparison of performance to neighboring states, and funding and budget priorities. This section also contains a set of questions to query customers about their roadway usage.
- A **contact list** of persons responsible for one or more maintenance-related customer survey.
- Excerpts from requests for proposal documents that illustrate the format and content of a **Statement of Work** for customer research.
- A **cost comparison of research methods** (telephone, paper, or e-mail/Web methods of survey administration including focus groups) along with examples of the actual costs associated with surveys conducted by SHAs.

5. Conclusions

Overall, this project demonstrates that the concept and practice of incorporating customer input into highway maintenance programs is evolving in tandem with the transformation of these programs in their efforts towards making the best use of maintenance resources. Eliciting customer input to guide planning was introduced as early as the late 1980s, when quality plans were added to current maintenance-management practices, and the practice was emphasized in the 1990s, when maintenance management increased in complexity with performance-based road maintenance requirements. As a result, many of today's measurement systems for highway maintenance management have adopted more elaborate customer-oriented measures. A range of objectives and motivations exist for obtaining customer input-related highway management programs. These include:

- Highway performance measurement, the most frequent application, collects information from road users to measure the extent to which highway current levels of service meets road users' expectations, and this information is then used to identify the improvements that can be achieved based on road users' perception of the condition of the highway.
- Performance target definition relates to the level of service at which highway assets must be maintained and customer input can be used for determining adequate levels of service from the road user's perspective.
- Perceived service quality relates to the sequence of events that a road user expects when driving through a work area or nearing roadway maintenance operations. This focuses on the services delivery method and how the service is provided by the agency or its subcontractors—otherwise known as maintenance service delivery.

This project led to a number of broad observations related to the practice of conducting, reporting, and using customer surveys related to highway maintenance operations:

- **SHA Maintenance Programs Are Becoming Increasingly Customer-Centric.** This project shows the trend, over the past two decades, for SHAs to turn their attention towards customer-oriented measures with the goal of obtaining a better understanding of their road users. This trend has evolved concurrently with the transformation of state highway maintenance quality programs. Still, resistance to conducting formal customer research exists among some SHA maintenance organizations. This project uncovered a number of reasons for this resistance including: (1) lack of leadership support, in general; (2) apprehension to elicit customer research based upon feedback that is already received via customer service department hotline or complaint cards; (3) limited resources including staffing and already stretched budgets; and (4) perceptions that the maintenance program is not a high priority within the department.
- **Significant and Highly Relevant Guidance on Incorporating Customer Research into SHA Maintenance Programs Already Exist; Many SHAs are Unaware of These Resources.** A number of NCHRP reports and guidance documents have been developed over the past decade to guide practitioners and decision makers on (1) using customer input to establish maintenance program performance measures and to monitor customer satisfaction over time, (2) designing and administering customer research, and (3) using customer data for program benchmarking and maintenance planning. However, not all of the resources are focused only on highway maintenance, and while some are too advanced for a general practitioner, most of the resources contain highly relevant information on survey design, question formulation, survey administration, and analysis for the general practitioner. SHAs would benefit from learning from their peers and other SHAs with more advanced customer research efforts that are well-established; moreover, this project demonstrated that these experienced SHAs are interested in and willing to share their successes with others.
- **Many of the SHAs Maintenance Programs Report to Have Conducted at Least One Customer Survey; The Focus Was Not Necessarily on Maintenance Services.** In a survey of state agencies conducted in NCHRP Synthesis 300, 68 percent of agencies responding to the

survey reported they had conducted at least one survey to identify customer preferences and interests. This review indicates that while a number of SHA maintenance programs have conducted a single baseline survey for establishing measures, most reported having knowledge of a statewide customer satisfaction survey (not for establishing maintenance performance or level of service measures) or relying on an agency-wide customer satisfaction survey with only a handful (if even that) of questions pertaining to their maintenance program. While this is a working hypothesis, it appears that the extent to which a SHA maintenance program conducts customer surveys to inform their maintenance programs depends upon the maturity of their MQA program and their internal capacity in customer surveying.

- **Few State Agencies Reported Using Customer Input in Meaningful Ways Beyond Measuring or Monitoring Customer Satisfaction With Services and Operations.** Using customer research to monitor customer opinions on maintenance product and service delivery and using that research to identify gaps in performance (and use that information to support decisions to shift service or product delivery priorities and to justify budget requests) was by far the most common use of customer data. While some examples of other uses were obtained and documented, they mostly informed setting customer-based target values, benchmarking their own program from year to year, or benchmarking against neighboring programs. Similarly, in NCHRP Synthesis 300, only one-third of state agencies reported that information about public opinions of their maintenance and performance is definitely used by agency management.
- **Few SHAs Maintenance Programs Have Fully Adopted a Sound Practice for Continual Customer Research.** This project shows that while many SHAs are conducting customer research, only a handful of SHA maintenance programs are conducting customer research as a continual process. However, those that are appear to be using sound research practices. The key characteristics of these programs include (1) having conducted a baseline survey from which maintenance performance measures reflecting roadway users could be developed and conducting customer satisfaction surveys every few years thereafter, (2), following statistically sound research methodology from the research instrument design to sample design to the use of focus groups or structured interviews to develop the instrument and/or explore findings, and (3) using research findings internally (to drive maintenance program policy and funding decision making) and externally (to keep the public informed on progress in delivering roadway maintenance services).

The information compiled in this report, along with the supplemental resources contained in Volume 2, serves as a compendium of resources to assist SHA maintenance organizations in their continued and expanded efforts to conduct customer research.

Appendix A: Annotated Summaries of Customer Research

The following summaries correspond with those presented in Table 3 of this report. For survey data, the meta-information includes survey universe (i.e., who was asked the questions), sample size (i.e., number of respondents), margin of error (i.e., the results spread as a result of random sampling error), and sample type (i.e., method by which the sample was drawn).

State:	Arizona Department of Transportations (ADOT)
Survey Title:	Customer-Oriented Level of Service Maintenance Management System
Method:	Telephone Survey, Focus Groups (92), Supplemental Survey
Universe:	Arizona Residents
Sample size:	Unknown
Margin of error:	Unknown
Sample type:	Random Sample
Description:	This project was developed to establish a customer-oriented LOS (Level of Service) maintenance management system that focuses on the needs of Arizona's traveling public and to identify the results of ADOT's maintenance work. The survey gathered public perception of Arizona's highway maintenance program through focus groups and attitude surveys, which identified customer needs and concerns. The survey involved telephone surveys with maintenance managers in twelve states to identify the state-of-the-practice in maintenance operations; following the initial interviews, maintenance managers in three states were contacted to provide additional details in specific areas. Focus groups were held with 92 statewide ADOT maintenance staff. The supplemental survey determined how customer service data are used in setting performance targets and translating customer expectations into budgets. From the survey, ADOT learned that customers would like to see improvements in all maintenance areas, though most respondents indicated that they were satisfied with highway maintenance efforts.

State:	California – County of San
Survey title:	Road Maintenance Survey
Method:	Unknown
Universe:	County Residents
Sample size:	Unknown
Margin of error:	Unknown
Sample type:	Unknown
Description:	This is an annual survey that began in 2001 and is administered to various county residents. The number of survey recipients/respondents within the survey area varied widely from year to year. The survey is managed by the Road Maintenance Section, which ensures that County-maintained roads are safe, accessible, and maintained cost-effectively. The Road Maintenance survey results are designed to inform decisions for future development of a maintenance management program for road maintenance. Respondents were asked to rate the Road Maintenance team's ability to respond to service requests and to perform street-sweeping duties. Overall, the County of San Mateo is interested in how it can improve services to their customers and reduces costs.

State: California Department of Transportation
Survey Title: 2005 Highway Maintenance Customer Survey
Method: Online Survey
Universe: California Residents
Sample size: Unknown
Margin of error: Unknown
Sample type: Unknown
Description: This statewide survey focused on customer feedback on the California Department of Transportation's (CALTRANS) ability to execute its highway maintenance responsibilities. Customer satisfaction was measured for a number of items, including removing debris and litter, maintaining signage, removing graffiti, pavement markings, road repair, etc. Survey topics also included rest areas and seasonal maintenance. Customers were asked to rank the areas of maintenance that needed the most improvement, and then were asked which areas ranked as the highest priority and the lowest priority.

State: Florida
Survey Title: 2002 Customer Satisfaction Survey Results
Organization: Florida Department of Transportation (FDOT)
Method: Mail and Telephone Survey
Universe: Florida Residents and Visitors, Government Officials, and Special-Needs Populations
Sample size: 3,070
Margin of error: Unknown
Sample type: Stratified Random Sample
Description: The survey was developed based on the results of focus groups and interviews held in 1999, and followed a customer satisfaction survey conducted in 2000. The survey was meant to determine how customers rated FDOT's work and to identify areas 1.) needing improvement and 2.) requiring additional attention from FDOT. The mail portion of the survey was administered to government officials (476) and Well-Elders (a special-needs population, 396), while the telephone survey was administered to Florida residents (1,750) and visitors to the state (448). Floridians were asked to indicate their level of satisfaction with items related to travel, including congestion, speed on highways, roadside appearance, construction zones, pedestrian crossings, etc. The 2002 survey aimed to gauge improvements that were identified since the 2000 survey.

State: Kansas
Survey Title: 2000 External Customer Survey
Organization: Kansas Department of Transportation
Method: Telephone Survey
Universe: Kansas Residents
Sample size: 1,848
Margin of error: +/- 2.2%
Sample type: Random Sample
Description: The Kansas Department of Transportation conducted its statewide customer satisfaction survey during the fall of 2000 as a follow-up survey to the one that was completed in 1997. The purpose of the survey was to provide KDOT with information regarding how well the agency was meeting the transportation needs of Kansas residents. Part of the survey included questions related to highway maintenance. Overall, the satisfaction levels with highway maintenance had increased from 1997 to 2000. The most important maintenance activities were: fixing potholes, snow removal, pavement markings, fixing cracks, and maintaining lighting. Results from 1997 and 2000 helped KDOT determine which areas of highway maintenance were valued the most by Kansas residents, which areas provided opportunity for improved services, and how maintenance activities have performed over time.

State: Kansas
Survey Title: 2007 Statewide Customer Satisfaction Survey
Organization: Kansas Department of Transportation (KDOT)
Method: Telephone Survey
Universe: Kansas Residents
Sample size: 947
Margin of error: +/-3.2%
Sample type: Stratified Random Sample
Description: The 2007 survey was the fourth survey of its kind; previous surveys have been administered in 1997, 2000, and 2003. The survey was meant to obtain information about customer satisfaction levels with KDOT services and to identify priorities for improvement. This telephone survey was completed by 150 Kansas residents in each of KDOT's six districts. The results of this survey were compared with the results of previous years; from this comparison, KDOT was able to assess trends. The survey also asked respondents to compare KDOT's services with those of other state SHAs. Services surveyed include conditions of bridges, rest areas, conditions of surfaces, landscaping, etc.

State: Kansas
Survey Title: 2007 KDOT Post-Construction Survey
Organization: Kansas Department of Transportation (KDOT)
Method: Mail
Universe: Kansas Residents
Sample size: 428
Margin of error: Unknown
Sample type: Stratified Random Sample
Description: This survey was conducted to assess three specific highway improvement projects. The survey was mailed to respondents in the three areas corresponding to the three projects. Fifty-four stakeholders were also surveyed. Survey questions related to work zones, speed limits in construction zones, safety in construction zones, the means by which they received information about highway projects, and their overall satisfaction level with the completed projects.

State: Kentucky
Survey Title: Annual Assessment of Customer Needs and Satisfaction
Organization: Kentucky Transportation Center
Method: Telephone Survey
Universe: Kentucky Residents
Sample size: 657
Margin of error: +/-3.82%
Sample type: Random Sample
Description: The Kentucky Transportation Cabinet, to achieve new levels of quality in their highways, contracted a customer needs and satisfaction survey. The study followed a 1995 customer satisfaction survey and evaluated the opinions (priorities and satisfaction) of Kentucky highway users and compared these opinions with data collected in the NQI Survey (which served as the template for this survey), and established a baseline of customer satisfaction to determine needs. Kentuckians were asked to indicate their level of satisfaction with specific highway system-related issues and to prioritize these issues of greatest importance. Respondents assessed bridge and pavement conditions, maintenance response time, safety, amenities, and traffic flow on a 1–5 rating scale.

State: Louisiana

Survey Title: DOTD Customer Satisfaction Survey

Organization: Louisiana Department of Transportation and Development and Louisiana Transportation Research Center

Method: Telephone

Universe: Louisiana Residents

Sample size: 1,600

Margin of error: +/-2.5%

Sample type: Random Sample

Description: The Louisiana DOTD conducted this survey in 2003 to establish levels of satisfaction with general and specific aspects of the state maintained highway system, using a grading scale. Louisiana DOTD used the findings of the survey to develop strategies to improve its standing with their customer base and to identify practices that can be revised or improved. The survey assessed the conditions and satisfaction levels of bridges, pavement, safety, congestion, maintenance, work zones, and communications. The questionnaire contained closed- and open-ended questions, and all information was collected via telephone. The findings of the survey indicate that the overall state highway system has been assessed at a C+ grade, though individual components were graded higher. Close to half of the respondents indicated that the highway system has improved in the past five years.

State: Louisiana

Survey Title: Business Improvement Plan – Maintenance Level of Service Budget Manual

Organization: Louisiana Department of Transportation and Development (DOTD)

Method: Telephone Survey, Focus Groups

Universe: Louisiana Residents

Sample size: 401

Margin of error: Unknown

Sample type: Stratified Random Sample

Description: This 2007 survey was conducted as part of Louisiana DOTD's Maintenance and Budgeting implementation plan. The survey defined Louisiana DOTD's level of service, upon which annual maintenance programs were then designed. Louisiana DOTD developed their budget based upon this survey as well and included 23 different maintenance elements to be assessed. Measures were developed for all elements, which were broken down into sub-levels and given a grade. These elements were grouped into eight different categories, to make the survey more manageable. To determine these elements, DOTD held a series of workshops with maintenance personnel. Two methods were used in this survey to determine public perception: telephone and focus groups.

State: Louisiana

Survey Title: Business Process Improvement Plan – Team Nine: Maintenance Planning and Budgeting

Organization: Louisiana Department of Transportation and Development (DOTD)

Method: Telephone Survey, Focus Groups

Universe: 401

Sample size: Louisiana Residents

Margin of error: +/-5%

Sample type: Stratified Random Sample

Description: This 2006 survey measured customer priorities to integrate into a performance-based maintenance management and planning process using two methods. Telephone surveys were conducted with 401 Louisiana residents to establish Louisiana DOTD's level of service; focus groups followed, to validate the initial survey findings, and were held with residents of Baton Rouge and Natchitoches, LA. A third focus group interviewed selected Louisiana DOTD staff. The survey measured overall efficiency, current maintenance levels for eight asset types, desired maintenance levels for these asset types, and helped to prioritize program funding. Overall, Louisiana residents were found to be dissatisfied with current maintenance efforts.

State: Maryland

Survey Title: The Maryland State Highway Administration Customer Satisfaction Survey 2006

Organization: The Maryland Department of Transportation State Highway Administration (SHA)

Method: Telephone Survey

Universe: Maryland Residents

Sample size: 2,462

Margin of error: +/-2.0%

Sample type: Stratified Random Sample

Description: Maryland SHASHA conducted this survey in 2006 to assess customer satisfaction with SHA operations and collaborated with Schaefer Center for Public Policy to conduct the survey. The survey was designed to assist SHA with their future planning, as part of Maryland's Managing for Results Program and was developed using input from focus groups (in each district and with SHA district engineers and analysts) and using analysis from past surveys and the SHA business plan. The survey included questions about general SHA operations and specific planning requirements, and respondents were asked to rank SHA responsibilities (22 in all) in order of importance and to grade SHA on these responsibilities, which ranged from clearing roads after accidents to picking up litter to landscaping for roadways. Maryland SHA conducted the same survey again in 2008, completing 2,333 surveys with similar results.

State: Missouri

Survey Title: Transportation Customer Survey

Organization: Missouri Department of Transportation (MoDOT)

Method: Telephone Survey

Universe: Missouri Residents

Sample size: 4,000

Margin of error: +/-3.0%

Sample type: Stratified Random Sample

Description: This survey replicated the Constituent Service Quality Survey, which was conducted in 2000. This 2004 survey updated the previous survey and used the CSQS as a benchmark to identify areas of importance within MDOT's operations. The survey assessed customer satisfaction of these operations (31 total) and identified the level of importance placed upon them. Using the findings from this survey, MDOT was able to compare satisfaction levels with those determined in the 2000 survey and any improvements. MDOT contracted with the University of Missouri-Columbia for the survey. Four-hundred responses were collected in ten regions across the state. The research team also conducted interviews (20 total) with key stakeholders representing community governments, legislators, and planning and development councils to garner further input. The survey itself asked respondents to grade MDOT operations on a 1–4 point grading scale.

State: Missouri

Survey Title: 2007 Maintenance Performance Indicators Report

Organization: Missouri Department of Transportation

Method: Unknown

Universe: Missouri Residents

Sample size: 2,587

Margin of error: Unknown

Sample type: Unknown

Description: The performance indicators used in the 2007 survey are used in an analysis to measure the level of service provided on asphalt and concrete pavements, paved and unpaved shoulders, drainage, roadsides, and traffic control. The data collected were compiled into overall level of satisfaction (LOS) ratings, which measure customer satisfaction with the highway system. The Missouri Department of Transportation has collected this information since 2001. Data from year to year is used to identify trends. Results from the survey are used by district maintenance managers to identify the condition of the highways and plan their maintenance program budget for the fiscal year 2008.

State: Montana

Survey Title: Perceptions of Highway Maintenance in Montana in 2008: The Results of a Telephone Survey

Organization: Montana Department of Transportation (MDOT)

Method: Telephone Survey

Universe: Montana Residents

Sample size: 1,039

Margin of error: Unknown

Sample type: Random Sample

Description: This survey is conducted biannually and elicits Montana residents' views on Montana highway maintenance. Respondents were asked to rate certain aspects of MDOT's operations, including winter maintenance, surface maintenance, roadside and debris maintenance, etc. These ratings were used to rank maintenance priorities using two different methods. The results of the 2008 survey were compared to the results of the 2006 survey, and no significant difference was reported in ratings.

State: North Dakota

Survey Title: North Dakota Department of Transportation 2008 Customer Satisfaction Survey

Organization: North Dakota Department of Transportation (NDDOT)

Method: Telephone Survey

Universe: Motorists, Motor Carriers, Government Officials, North Dakota Businesses

Sample size: 1,021

Margin of error: Motorist: +/-4%, Motor Carriers: +/-4.75%, Government Officials: +/-4%, ND Businesses: +/-9%

Sample type: Stratified Random Sample

Description: This survey is identical to the Customer Satisfaction Survey that was conducted in 2004 and 2006 and aims to evaluate the satisfaction of NDDOT's stakeholders and to identify areas needing improvement, while evaluating satisfaction over time. The survey measures how well the DOT meets the needs of the state's motorists (600), motor carriers (220), government officials (115), and businesses (86). A different survey was designed for each of the four groups, but the questions remained largely the same, allowing for consistency in comparisons. The survey covered topics such as ride quality, snow and ice removal, safety, debris removal, rest areas, etc. For each topic, customers were asked to determine their level of satisfaction, on a 1–5 scale. The survey found that all four groups of stakeholders had a higher level of satisfaction with NDDOT's performance than in 2006.

State: Ohio

Survey Title: 2006 Flexible Pavement of Ohio (FPO) Customer Quality Survey

Organization: Flexible Pavements of Ohio

Method: Mail

Universe: Asphalt pavement customer constituent groups in Ohio, including municipal and county public works officials, consultants and the Ohio Department of Transportation

Sample size: Unknown

Margin of error: Unknown

Sample type: Unknown

Description: In 1994, FPO adopted a long-range plan to improve the quality of asphalt pavements constructed in Ohio. In 2004, FPO decided to assess present conditions to anticipate future needs. To execute this, they focused on the needs of the customers—including municipal and county public works officials, consultants, and ODOT. The Ohio Department of Transportation partnered with Flexible Pavements of Ohio to administer a survey by mail to collect feedback on the current condition of asphalt, as well as the future needs of the customer.

State: South Carolina

Survey Title: Highway Maintenance Survey

Organization: South Carolina Department of Transportation

Method: Mail

Universe: South Carolina Residents

Sample size: 3,600

Margin of error: Unknown

Sample type: Random Sample

Description: In 2003, SCDOT conducted its first Customer Satisfaction Survey of South Carolina residents. The goals of the survey were to 1) assess public opinions concerning highway maintenance, congestions, planning issues, and highway interchanges; 2) to grade highway maintenance activities; and 3) to obtain the public's assessment of SCDOT funding. The survey was completed by mail by 3,600 respondents, who were asked to rate maintenance activities by importance. Respondents were also asked to assign a letter grade to each maintenance activity, which allowed SCDOT to determine how customers valued fixing perceived problems. In doing so, SCDOT was able to figure the four most problematic categories: highway surface, roadside, bridges, and driveways.

State: South Dakota
Survey Title: South Dakota Department of Transportation 1999 Customer Satisfaction Assessment
Organization: South Dakota Department of Transportation
Method: Telephone Survey
Universe: South Dakota Residents, Legislators
Sample size: 734
Margin of error: Unknown
Sample type: Stratified Random Sample
Description: South Dakota had previously completed statewide Customer Satisfaction Assessments in 1997. The purpose of the assessments is to continue to measure the Department of Transportation's performance defined by the attitudes, needs, opinions and perceptions of its diverse customer base. The study was designed to understand residents' attitudes of SDDOT performance, including how SDDOT can become more customer-focused and market-driven. In addition to the survey, SDDOT conducted a number of one-on-one interviews, which helped develop the discussion guide for the six focus groups that were held in three of four SDDOT Regions.

State: South Dakota
Survey Title: South Dakota Department of Transportation 2002 Statewide Customer Survey
Organization: South Dakota Department of Transportation (SDDOT)
Method: Telephone Survey, Focus Groups
Universe: South Dakota Residents
Sample size: 1,182
Margin of error: Unknown
Sample type: Stratified Random Sample
Description: This survey is the third in a series of surveys that evaluates SDDOT customers' needs and attitudes, but it is the first to gather information from different user segments (going beyond the general public), including citizens, travelers, farmers, emergency vehicle operators and carriers, shippers, and legislators. The research assesses the opinions of customer groups about the importance and quality of SDDOT's services and products, the progress of the department, and improvements that can be made to SDDOT's performance. The survey asked respondents to rate performance of maintenance operations on a 1–10 point scale. The results provided a framework for SDDOT's management action plan. Also recommended from the survey was a media relations and communications plan, a strategy for travel information, and plans for incident response and educational programs.

State: South Dakota

Survey Title: SDDOT 2006 Statewide Customer Satisfaction Assessment

Organization: South Dakota Department of Transportation

Method: Telephone and Online Surveys

Universe: Stakeholders, including South Dakota Residents, Senior Citizens, Shippers/Truckers, Emergency Vehicle Operators, and Farmers/Ranchers.

Sample size: 1,861

Margin of error: Unknown

Sample type: Stratified Random Sample

Description: South Dakota had previously completed statewide Customer Satisfaction Assessments in 1997, 1999, 2002, and 2004. The purpose of the assessments is to gather data from residents and persons who impact transportation decisions in the state of South Dakota to help identify short-term and long-term transportation priorities for the Department. The customer data collected since 1997 is used as part of SDDOT's ongoing strategic planning process. Four "Priority Areas for Action" were identified through the 2006 results, which SDDOT will focus on in order to manage customer-oriented improvements over the next two years. In addition to the survey, SDDOT conducted 53 one-on-one interviews, which helped develop questions for the 12 focus groups that were conducted to identify customer expectations related to transportation services and how customers evaluate SDDOT performance.

State: Tennessee

Survey Title: 2006 Statewide Customer Satisfaction Survey

Organization: Tennessee Department of Transportations (TDOT)

Method: Mail

Universe: Tennessee Residents and Elected Officials

Sample size: 2,200

Margin of error: +/-2.3%

Sample type: Random Sample

Description: This survey was TDOT's first customer satisfaction survey, the purpose of which was to assess TDOT's overall performance, and to identify short- and long-term transportation priorities and needed improvements most important to its customers. The results of the survey were used to help evaluate the effectiveness of TDOT's Strategic Plan and to manage customer-oriented improvements for the subsequent two years, i.e., top priorities as determined by the customers. The Customer Satisfaction Survey consisted of three major components: (1) stakeholder interviews, (2) focus groups, and (3) statistically valid surveys. The surveys included a survey of residents, a survey of elected officials, and a benchmarking survey of residents in eight states surrounding Tennessee. From the survey, TDOT was able to determine "Next Steps" for the organization, including another survey in the summer of 2008.

State: Washington
Survey Title: 2000 Maintenance Customer Survey
Organization: Washington State Department of Transportation
Method: Telephone Survey
Universe: Washington State residents, divided into three geographic regions
Sample size: 632
Margin of error: +/- 4%
Sample type: Stratified Random Sample
Description: This survey was used to evaluate customer satisfaction of state highway maintenance activities. The survey measured general satisfaction level with the level of highway maintenance statewide and identified areas for improvement. Such areas included roadway surface, removal of litter, roadway signs, and snow/ice removal, etc. A gap analysis between satisfaction levels and importance level was presented in the final report and proved to be helpful with identifying priorities. Results from the survey were used, in conjunction with other tools and resources available to inform maintenance managers. More specifically, the survey was used as a tool for managers to use for delivering the highway maintenance program towards a more customer-oriented focus.

State: Washington
Survey Title: 2005 Maintenance Customer Survey
Organization: Washington State Department of Transportation
Method: Telephone survey
Universe: Washington State Residents, divided into three geographic regions
Sample size: 802
Margin of error: +/- 3.5%
Sample type: Stratified Random Sample
Description: The 2005 Maintenance Customer Survey was conducted as a follow-up to the survey conducted in 2001. Like the 2001 survey, the 2005 survey was designed to evaluate customer satisfaction of state highway maintenance activities. Using the results from both surveys, WSDOT was able to compare the results from each year, allowing for a trend analysis. The 2005 data was also used to inform maintenance managers on public perception of maintenance activities in general including public priorities of maintenance activities, which can be used for future planning and reaching the goal of becoming a more customer-oriented Department.

State:	Wisconsin
Survey Title:	WisDOT Customer Satisfaction Survey Results
Organization:	Wisconsin DOT
Method:	Telephone Survey
Universe:	Wisconsin Residents
Sample size:	2,030
Margin of error:	+/-2.1%
Sample type:	Stratified Random Sample
Description:	<p>WisDOT conducted a customer satisfaction survey across multiple areas. The goal of the survey was to measure and evaluate customer satisfaction and to prioritize their decision making about transportation projects. WisDOT aimed to reach as many different groups as possible, provide comparable measures across different divisions, measure key service elements, measure customer priorities, and identify key issues that would cause customers to be unsatisfied with WisDOT's performance. The study looked at six target customer groups: DMV in-person; DMV by phone, mail, or online; traffic and road construction; state highway travelers; division of state patrol; and persons impacted by highway construction. While this survey acts as a benchmark for an ongoing process of obtaining customer input, this was the only instance of WisDOT conducting this survey. The study found that all areas of WisDOT are performing at high levels.</p>

Appendix B: SHA Maintenance Program Interview Questions

Section A: Current customer surveys organization conducts or has conducted

1. First, tell me how you fit into your agency in terms of the organizational structure.
2. List the customer surveys your agency currently conducts or has conducted, along with the date(s) and contact person. If available, bring copies of surveys or reports to the interview.

Survey Name	Conducted	Contact Person	Contact Information

3. Which of the following best characterizes each of the surveys you listed above (assign a letter to each survey title)
 - a. It measures customer satisfaction with our organization's overall performance without explicit questions on maintenance.
 - b. It measures customer satisfaction with our organization's overall performance and contains one or more questions on maintenance.
 - c. It measures customer satisfaction in only one or more functional areas, but not maintenance.
 - d. It specifically measures customer satisfaction on maintenance operations.

The following questions pertain to any survey from above that you labeled as b or d:

4. Describe "the customer" who was surveyed.
5. Why did your organization decide to conduct the customer survey?
6. To the extent that you can, explain who is (was) involved in developing the survey.
7. Tell us how your organization uses the data from the survey
 - a. Was it a multi-functional team, a single office/person, a contractor, etc.
 - b. Was the survey customized for your agency or was another survey or question pool for questions?
 - c. Was preliminary research conducted first, such as focus groups or interviews like this?
8. Is the survey administered by an in-house or consultant research team?
9. Describe how your agency makes use of the data from the survey.
10. Did/does the survey data impact decision-making related to how funds were allocated across your agency? If yes, tell us about it.
11. Is there anything you think should be done differently in conducting future surveys related to maintenance operations?

Section B: Customer satisfaction on maintenance operations, in general

1. Does your agency have a maintenance operations quality assurance program? If so, does it explicitly have objectives or require customer input or statistics? How do you get this input?
2. Does your agency have performance measures related to maintenance operations? If so, do they require customer input or statistics? How do you get customer input?
3. **(New) IF NO CUSTOMER SURVEY IS BEING PERFORMED:** Do you think conducting a customer survey on maintenance would be useful for your organization? How receptive would the Executive staff or your managers be?
 - a. If not receptive: At this year's MQA peer-exchange the value of doing customer surveys came up a few times and it's believed it will become a standard of practice for State DOT's.
 - i. Do you feel they understand the value of conducting customer surveys? What do you think it will take to sell the idea of conducting customer surveys? Who should the messenger, or person responsible to getting customer surveys approved?
4. What are the maintenance operations that could be covered in a customer survey? Do these items cover what is meant by "maintenance operations?" **PROBE ON:** Which term "maintenance operations" or "routine maintenance" is more succinct in describing what your unit/department does? **IDEA IS TO SEPARATE IT OUT FROM OPERATIONS AND CONSTRUCTION.**
 - a. Bridges condition
 - b. Pavement condition
 - c. Roadway condition
 - d. Roadside (Mowing, litter and debris, brush/tree control or landscaping, sloping, guardrail)
 - e. Drainage
 - f. Traffic control (signage, pavement markers and striping, symbols)
 - g. Construction related to repairing or restoring roadways
 - h. Winter or seasonal maintenance
 - i. Other, specify: _____
5. **What measures are important for a Customer survey for maintenance operations?**
 - a. Satisfaction with specific maintenance operations areas (which areas?)
 - b. Satisfaction with maintenance operations in general
 - c. Trust in agency's ability to maintain highways
 - d. Ranking of maintenance operations in order of importance
 - e. Perceptions about the conditions of bridges, roadways, pavement, roadsides, etc.
 - f. Knowledge of the agency responsible for highway maintenance
 - g. Impact of maintenance on customer travel time, delays, and costs
6. **Of the above measures, select the top three customer measures you think are essential? For each, explain why.**
7. **Which is the least essential? Why is that?**
8. **To what extent is benchmarking customer input on your organization important? Answer in respect to:**
 - a. Benchmarking customer opinions on your maintenance operations against previous years
 - b. Benchmarking customer opinions on your agency's maintenance operations against other agencies?

9. We will be preparing guidelines for conducting customer surveys. What would you want to know or hope to see in these guidelines?
10. Explain this interview will help us craft a survey of State SHAs about practices or interest in customer surveys. To whom should the survey be sent to in your organization?

Appendix C: Case Study Interview Guide

INTERVIEW GUIDE

I. Context

1. Tell me when and why customer surveys were first considered as an information resource for your Maintenance Program? Was it for the MQA Program?
2. Provide details on the political, institutional or other situational factors that may have led to their use by your program/department?
 - a. Purpose
 - i. Used for defining MQA Program measures or Level of Service?
 - ii. Was research conducted to collect customer expectations on which a maintenance program or measures/ LOS were developed? (Component #2)
 - iii. Was/is research conducted to assess satisfaction with maintenance program (Component #8)
 - b. Is the research only on maintenance or is it part of an Umbrella or Agency-wide survey, why is that? Why not conduct it own your own?
 - c. Is the survey/survey's part of an Agency-wide customer or strategic effort? Tell us about it.
3. Current concerns for issues—what are the major issues facing your agency regarding obtaining customer input via surveys or other research means
4. Review/list the research/surveys that are conducted for the maintenance program

II. Facts about the research or survey program

1. Funding:
 - a. How much does it cost to conduct?
 - b. Is the funding part of Maintenance Program operating budget? Is the survey earmarked?
 - c. Is federal funding used? FHWA or another source specifically for customer surveying? Are funds available?
2. Administration: Map out the process, from planning to completion for conducting the survey
 - a. In-house? By what department? How does the Maintenance Program provide input?
 - b. Contracted out? By what department? How does the Maintenance Program provide input? May we have a copy of the SOW or Contract?
3. Methods
 - a. What is the purpose of the survey?
 - b. Survey Methods—Mail, Telephone; to what extent is Web being used; mixed mode? Advance letters?
 - c. Statistical Sampling—How is the survey population defined (users of the highway facilities)
 - i. Eligibility: licensed drivers residing within the jurisdiction (county, state) fo the agency, residents of the study are with a valid drivers license, etc.
 - ii. Sampling frame: what is the source of the sample? DMV records? Other?
 - iii. Type of sampling: Random sampling? Stratified random sampling?
 - iv. Sample size: what is the sample size? How was it selected?
 - d. Questionnaire

- v. Who developed it?
- vi. Were focus groups conducted? How?
- vii. What rating scales were selected? Why?
- viii. Other types of questions, such as level of importance of activity? Allocating \$100, etc.
- e. Pretest questionnaire—was it pretested? With who? How?
- f. Administration
 - ix. How is the survey conducted? Focus group, telephone, paper mode? Why did you select the mode you use? Have you ever considered using other modes? Why or why not?
 - x. How is the customer defined? Is there segmentation or is the sample stratified?
 - xi. What is the sample size and how was the sample size determined?
 - xii. Who drafted the questionnaire? Was anyone within the MP involved? Who? How?
- 4. Who conducts the analysis? Is the analysis on all customers as a whole or analyzed on a geographic or other customer characteristic?
- 5. What is the most unique and distinguishing aspect of your survey method/design, would you say?

III. Challenges Encountered

- 6. Perspectives on the survey planning, execution or use relating to the challenges that emerged and how (if) these were overcome
- 7. Actions taken
- 8. Any changes made to the survey or its execution

IV. Outcomes

- 9. How easy has it been to secure continued research funding and support to maintain the research over time?
- 10. How have the research findings been used? One or two concrete examples (e.g., survey findings showed that customer's priority was X and we used that data to re-shift our work priorities...or we used that data when defending our budget to the state legislature, etc.)
- 11. Is anyone else using the research data outside of your program?
- 12. What lessons for conducting customer surveys can be learned from this case? How about advice to others?