

New England Data Quality Partnerships

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The collection of transportation data by State transportation agencies is a major activity consuming a significant portion of their resources. The quantity of data seems to be always increasing while the resources are dwindling. This is the case in the northeast portion of the country where State budget cuts are forcing reductions in staff and increasing needs in quality data for decision making. The New England States of Connecticut, Maine, Massachusetts, New Hampshire, Rhode Island, and Vermont have been cooperating and working together to help each other collect and share transportation data. This applies specifically to inventory, travel monitoring data, and performance data used by the States and reported to FHWA.

The New England States have been working together for many years in a concerted effort that has improved data quality in a more efficient and cooperative environment. These efforts have been facilitated by the States, FHWA, and consultants working cooperatively to develop data partnerships. These partnerships have been in existence informally for several years and most recently on a formal basis with consultant support. This report documents the activities that have occurred during the past four years and the reasons for successful efforts to improve data quality for the New England States.

DATA QUALITY ACTIVITIES

The activities undertaken in the past, with many still continuing, can be grouped into consultant studies, regional conferences and workshops, and review teams. FHWA has fully supported and funded all of these activities. The improved working relationships, expanded and open lines of communication, and excellent rapport resulting from all of these activities will continue to foster and strengthen these data partnerships.

Consultant Studies

There are three major consultant studies that have been undertaken by the New England States starting in 1993. One study was completed in 1996, and the remaining two are still ongoing for at least the next two years. These are all low-cost studies with each State contributing equally in both financial and technical support.

- New England Vehicle Classification and Truck Weight Program

This was a study to investigate the possibilities of these States sharing vehicle classification and truck weight data with each other and to develop a regional truck monitoring program. The results were: more data collection is necessary for a regional program, and data sharing should be encouraged. The precision level of each State's program would be increased if they used data from other States in their data base. This study has lead to the two other consultant efforts described later in this report.

This study was funded by the New England Transportation Consortium (NETC) in 1993 and completed in April 1996. The consultant was the University of Massachusetts, hired by the NETC that is funded by FHWA Statewide Planning and Research (SP&R) funds from each State. The NETC managed the contract with the FHWA Regional Office being the chairperson of the technical committee. This committee met frequently during the study not only to review and comment on progress but also to exchange and share experiences in traffic monitoring.

- Analysis of Vehicle Classification and Truck Weight Data of the New England States

This study is being conducted by Oak Ridge National Laboratory. A statistical analysis of each State's data will be performed to determine if similar travel patterns exist and how States can best use the data. All continuous truck data collected by each State in 1995 and 1996 will be analyzed considering validity of the data, use of the data for further statistical analysis, and recommending methods of grouping the data by either vehicle classification, axle groupings, or functional classification. This analysis will result in developing a combined data base of truck travel for each State to use.

This is an 18-month study which started in May of 1997. It is a continuation of the NETC-funded study with more comprehensive statistical analysis focusing on individual vehicle records for vehicle classification and truck weighing. A technical committee exists comprised of representatives from each State and FHWA Washington and Regional Offices staff. This is the first time that a statistical analysis of truck data has been performed for many of these States. It may reveal problems with data collection, site specific conditions, equipment, and uses of the data.

- New England Traffic Monitoring System

This is a regional pooled-fund project for the development of a comprehensive traffic monitoring system for each State and the New England Region. It will facilitate the further sharing of traffic data among these States and provide each State with access to sufficient data to have statistically reliable products and applications. Other benefits will be combined training, development, and implementation of a uniform system that can be implemented in a more timely and coordinated effort. Each State will obtain a traffic monitoring system that will be uniform in its data formatting, editing, and storage functions while enabling each State to analyze the data and produce reports that fulfill

State requirements. Data will be processed directly from counting equipment, edits will be performed, and reports generated automatically to meet each State and the New England States regional data needs.

This project is in the early stages of development with consultant work anticipated to start by the end of 1997. This project started as a result of several individual States pursuing the acquisition of traffic monitoring software exhibited at the last National Traffic Data Acquisition Conference (NATDAC). Since several States were interested in the same software, they decided that it would be more economical and feasible to participate in a combined effort. The FHWA Regional Office assisted these States in the development and approval of a regional pooled-fund project funded by each State with 100 percent Statewide Planning and Research (SP&R) funds.

Regional Conferences and Workshops

There have been several conferences and workshops for the FHWA Region One States, which include the New England States, with some on an annual cycle, some every three years, and others as special needs arise. These conferences have been well attended by most States and FHWA field offices with some hosted by FHWA. They addressed several different subjects related to the collection and use of transportation data. These included such data items as traffic, pavements, mileage, accident data, and roadway inventories. Specific conferences held during the past five years are discussed below.

- **Highway Performance Monitoring System (HPMS) Workshop**

Workshops have been held on a three-year cycle since 1986 to discuss timely and quality submissions of HPMS data. These two-to-three-day workshops have been hosted by a State for the technical HPMS staffs to get together and share experiences and procedures for collecting, coding, reporting, and analyzing individual data items. All States have participated and have been specifically on the agenda to present something unique, new procedures, or a significant accomplishment.

FHWA Washington and Regional Offices participated in discussing and interpreting review comments, explaining the data reviews conducted by FHWA, and answering questions. A questionnaire was sent to each State before the workshop asking how they code, collect, or interpret the HPMS Field Manual for about 35 different data items with a composite presented and discussed at the workshop.

Summaries of the review comment check sheets have been developed and discussed to show which and how many States have similar comments. This was very useful to facilitate discussion on how some States resolved these issues and what new procedures or practices were initiated.

- Traffic Monitoring Workshop

Since 1988, the States' traffic monitoring staffs have participated in these workshops being held on a three-year cycle. Data users and equipment vendors have also contributed. These workshops provided a means for the States to get together to share experiences and exchange technical information. The States have been hosting these meetings with FHWA developing the agenda and arranging for presentations. Each State has been actively involved by making a presentation on a unique or significant accomplishment.

Vendors have displayed the latest in technology, set up field demonstrations of the equipment, and have discussed new technologies. This provided an opportunity for the vendors to meet with the State's technical staff at one location within the New England States' region. Many of the technical staffs have never met with a group of vendors before because they were never allowed to attend national conferences or meetings.

- Transportation Coordinating Committee

This committee has been having annual meetings hosted by the State of New Hampshire for the past 33 years. The four States of Maine, Massachusetts, New Hampshire, and Vermont have been convening for this one-day meeting to discuss the latest efforts and status report on a variety of data collection activities. The State of Connecticut has recently participated in this meeting. Each State's midlevel managers, four or five technical staff, and FHWA field offices have participated.

The discussion focused not only on traffic and HPMS data but also GIS/GPS, accidents data, management systems, staffing and budget problems, and air quality. Copies of the latest annual traffic reports, traffic flow maps, analysis of travel data, and other data-related reports and procedures were provided to all States attending. These reports were provided directly to the appropriate technical staffs of each State.

- Weigh-In-Motion (WIM) Technical Exchange Meeting

This was a two-day meeting of State technical staffs working with WIM equipment to discuss implementing WIM technology, installation procedures, equipment calibration, analysis of data, and vendor support. It was attended by the six New England States and three Canadian Provinces. Since most of these States have purchased equipment from the same vendor, a meaningful discussion of problems and solutions was possible. SHRP representatives also participated.

This meeting was held in Maine in 1995 with a follow-up meeting proposed for 1998. States that had WIM programs were trying to improve their efforts of collecting and maintaining quality data. States having difficulty getting started were encouraged to begin collecting and analyzing data to overcome the fear of high cost, using sophisticated state-of-the-art equipment.

- FHWA Region 1 Pavement Management Conference

This annual conference has been hosted by the States on a rotating basis since 1981. Technical staffs from each State have participated along with equipment vendors, consultants, and FHWA offices. Traffic monitoring staffs frequently participated and discussed data collection activities and analysis of truck monitoring data. There have been a wide range of subjects discussed including pavement design, pavement data collection, traffic data needs, collection equipment reliability and accuracy, and uses of the data by States, FHWA, and local agencies.

This has been an excellent opportunity for the data users to meet and discuss issues with the data collectors. It has provided the traffic monitoring staffs with information on how their data is being used by the States and FHWA and the changes that have been occurring in national trends and policies in both pavement and truck monitoring data.

- FHWA Software Demonstration

A demonstration of the Vehicle Travel Information System (VTRIS) software and two other traffic data software programs distributed by FHWA was held in 1995 for all States. VTRIS is a computer software program that validates, summarizes, and produces reports on data from automatic vehicle classification and WIM equipment. More than 40 people attended this one-day demonstration that was hosted and funded by the FHWA Regional Office. Each State was able to meet their counterparts in other States involved with this software for future contacts and assistance, which has occurred on several occasions.

This was a hands-on demonstration with computers available for the three or four technical people that attended from each State. The developer of the software and FHWA Washington Office presented the demonstration and answered questions. Several suggestions for improvements and revisions were offered. The other software demonstrated was the Traffic Data Analysis Expert System and FHWA's Database of Traffic Monitoring Equipment.

Review Teams

The review team concept was used to provide technical assistance to States by representatives from FHWA and State technical staffs that could better relate to the subject and provide firsthand information. A major component of this effort was to get a State involved that was technically competent and was able to communicate effectively with other States. To date one review team has been developed with more possible in the future.

- HPMS Analytical Model

A review team, comprised of a technical staff from the Vermont Agency of Transportation (VAOT) and FHWA Washington and Regional Offices, visited two States in 1996 to discuss the HPMS analytical model. An overview of the analytical model was

presented and experiences from Vermont were discussed to a group of 15-20 people in each of these two States. A technical session followed explaining the details of the model and how each State can adjust the models to represent local conditions for design standards, needs identification, and investment levels. These States were considering the use of the analytical model but requested more information on its applicability, results, and validity for their State. The VAOT also gained valuable information from this review team effort to assist them in revisions to their current uses and suggestions for future activities.

REASONS FOR SUCCESS

There are many reasons why all these activities have occurred with many still continuing into the future. Some are obvious reasons, some are unique to these States, and others are proactive participation by all agencies involved. There are several direct reasons why these efforts have been so successful.

Close Proximity of States

The New England States are a compact region with each State bordering at least two other States, which have many border crossings and continuations of routes. Urbanized areas overlap into adjoining States and recreational patterns are similar for the five coastal States. Problems in data collection, budget reductions, limited resources, environmental influences on equipment and travel, economic conditions affecting travel behavior, and performance conditions are similar in a homogeneous region only separated by State boundaries. With these similar conditions, there are many relevant and current experiences and frustrations to share.

FHWA Regional Office Involvement

The FHWA Regional Office has been involved and is the lead FHWA office in all of these activities. This working relationship and rapport directly with the States provides valuable information on needs and problems. More timely technical assistance is provided by the Regional Office. Division Offices are always kept informed and provide input and support. The Division Offices support, participate, and contribute continually to ensure full participation by their State and to provide follow-up after each activity.

The proactive participation of FHWA is a key element of all these activities. It includes hosting meetings, arranging for presentations, developing agendas, and providing funding for meeting rooms and demonstration equipment. States are usually willing to provide or secure meeting facilities and necessary accessories, but are often reluctant to develop agendas which can be time consuming and frustrating. This has been an effective and rewarding role for FHWA, who has knowledge of activities in all States within the region, can arrange for technical assistance from Washington, and can moderate and facilitate discussions.

Visible Results

The results of these efforts, whether they be from consultant or the regional conference activities, have produced meaningful results appropriate for all New England States. The success stories and experiences keep building. This includes tidbits of information on equipment installation and maintenance to major activities such as developing comprehensive programs. States have continued to support these activities and to work cooperatively with other New England States because of the benefits they have realized in their programs. Frequent meetings and workshops are held because everyone realizes that there is always room for improvement and that this is the best and most effective method to achieve this goal.

One-Day Meetings

Many of the Regional Conferences and Workshops are one-day meetings at a central location within the New England Region. The small land area size of each State makes it possible for every State to be able to attend meetings scheduled between 9:00 a.m. and 3:00 p.m. without incurring overnight lodging. For States that have restrictions on out-of-state or overnight travel, this is a big benefit to be able to attend a meeting without requiring special approval or incurring cost. This has also enabled the technical committees for the consultant studies to meet frequently, which has been as often as every two months. These one-day meetings keep the momentum and interest going in participating and communicating with other States. Time out of the office and scheduling conflicts, rather than cost, usually control frequency of meetings.

SP&R Funded Activity

The consultant studies have been funded by each State using Federal-aid Statewide Planning and Research (SP&R) funds. The SP&R work programs for each State include descriptions and funding for attendance and participation in many of these activities. Funding has not been a deterrent for any State so far. Transportation data collection and the annual reporting of data to FHWA have been included in each State's SP&R work program with adequate funding and staffing. Support activities are addressed and included each year because of the recurring nature and the desire for States to meet and discuss their programs.

Active Participation

All States and FHWA actively participate in all meetings. The agendas are developed with most States making presentations or leading discussions. The formal lectures by FHWA are infrequent, and it is the States that usually control the agenda and focus of discussions. Input is always requested from each State in developing agendas for conferences and workshops with feedback, sometimes, on the level of interest for each topic. The States are more receptive to these type of meetings because it is about topics they want to discuss.

Ongoing Exchange of Information

All of the New England States have maintained an excellent rapport with each other for many years. There have been few staff turnovers, which makes it easier for the long-time staff to communicate with each other. Most States' staff is experienced in data collection. The continual exchange of traffic data at the State boundaries has helped each State to stay abreast of other programs, level of effort, and locations of monitoring.

FHWA has always promoted the exchange of information by encouraging States to distribute information and products of their programs at conferences and workshops. FHWA Regional Office has developed and distributed to the States summary information about each State's traffic monitoring programs to provide information about new, different, and effective elements rather than comparisons for best programs.

RESULTS

The results of these data quality partnerships have strengthened the data collection programs of all six States in many ways. Better quality data is available, more data is used in decision making, and the reliability and credibility of each State's program has been improved. This is occurring because the technical people involved in data collection have been actively involved in these data partnerships. These partnerships have succeeded because of the commitments and desires of the technical staffs to improve and to do more with less. Management has supported these partnerships even though they have not been the key players or participants.

Better Quality

The exchange of information, procedures, and experiences from all of the activities have improved the quality of the data for both State and FHWA uses. There have been improvements in quality reflected in the HPMS submittal with fewer comments being made by FHWA each year. The HPMS submittals are becoming more timely every year for most States. The comparison of individual data items between States in the data review booklet shows more uniformity in coding and reporting of data. Selected tables from the data review booklet have been provided to all States to identify similarities and differences that need to be addressed. States have used these comparisons to review their programs and to identify areas that may need change or improvement. Most States are reporting on all data items since they have learned from others the most efficient methods of collecting the data. A good example of this is the use of accident data to determine vehicle occupancy rates.

Prompt completion of FHWA monthly and annual reporting requirements is enhanced, and the data is transmitted by each State more efficiently. More of the data routinely collected is being used in monitoring trends and in statistical analysis because of its quality and reliability. Better quality has reduced the need for additional data collection.

More Quantity

Many of the States are sharing data with each other, especially that collected near State boundaries. This includes several of the HPMS data items. Some of the traffic monitoring data is being shared, and data that is similar is being compiled into a regional program. States have the option to use this regional information or to add selected locations to their own State's database. Adding or sharing locations, in some cases, is the only way to achieve statistical reliability of a program without additional resources. A good example of this is the use of truck data which has similar patterns throughout the region because of the many through routes and close proximity of States.

More use of the data for decision making is being made by States knowing that it is reasonable because of readily available comparison/analysis and accessibility to adjoining States. There is the ability to conduct vehicular flow studies within the region as a result of a larger and more detailed data. Such data would support other initiatives, such as goods movement, commercial vehicle operations, and identification of heavy vehicle corridors.

Preserve Resources

These data partnerships have enabled the States to preserve resources and still maintain and improve the quality of their data. The sharing of data means more data is available for each State to use without additional cost for data collection. The cost to construct, maintain, and manage new traffic monitoring locations has been reduced for each State. There is significant savings in not implementing only one or two permanent truck monitoring sites in each State. This data is also available sooner to each State without waiting several years for a new location to collect and provide reliable data.

The cost to perform statistical analysis of each State's program by having one consultant contract for the same analysis for each State has reduced cost considerably. The regional pooled-fund study has provided 100 percent Federal funding to the States and has reduced individual State costs for this one project by at least 60 percent. There is also savings in administrative costs by having one lead state administer the project as compared to six individual State projects. With the lead state having efficient administrative procedures, the time to implement and obtain results has been reduced considerably for most States.

Training costs have been reduced through the use of regional training and demonstration sessions, which also contribute to the open exchange of information. This facilitates the development of user groups and promotes the informal contacts and rapport between States.

Technology Sharing

The sharing of technology has been greatly improved with the opportunity to meet and discuss implementation issues frequently. The technical staffs at each State are able to easily converse

with each other and have maintained an excellent rapport for several years. Information on purchasing, installing, and maintaining equipment; communications with vendors; and tools of the trade have been possible on a regular basis. These open verbal communications by technical staff have been very productive in obtaining maximum utility and reliability of the equipment.

Statistical Analysis

Many of these States do not have either the resources or technical ability to perform statistical analysis of their data collection programs. These combined regional activities have enabled them, some for the first time, to have statistical analysis performed at a very reasonable cost. The analysis performed is based on the combined efforts of the six States to develop highly effective, meaningful, and thorough work tasks. Since the technical expertise within each State and resources available vary considerably, a combined effort has been very productive. In some States, statistical analysis would not be performed because of either lack of technical expertise, exorbitant costs, or varying results from consultants. The statistical analysis being performed has led to improvements in each State's program in both the data collection effort and in the more efficient use of the data.

SUMMARY

The numerous activities that all of the New England States have participated in has significantly improved their data quality. The partnerships formed have continued and facilitated the productive exchange of experiences and information in a cost efficient manner. Improvements in data quality have been significant, which has led to better and more effective use of data for decision making.

FHWA has promoted and supported the New England States' efforts by providing financial resources and timely technical assistance. The partnerships of not only the New England States but also the partnership of the New England States and FHWA will continue to be rewarding and productive.

Many of the activities that led to these data partnerships should be pursued by all States and FHWA Regions. The reasons for success are very practical and common sense items that are reflective of promoting enhanced working relationships within the data collection profession. Every State in the country is challenged to investigate and develop data partnerships with their neighboring States.