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**In-Service Training Needs for
State DOT's**

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EXECUTIVE SUMMARY

State departments of training are facing many challenging issues today. Customer expectations have never been higher. The pressure to deliver transportation services and mobility to our nation's population is intense. The passage of the Safe, Accountable, Efficient, Transportation, Equity Act: A Legacy for Users (SAFETEA: LU), brought historic federal funding levels to the states and yet state DOTs have probably never felt more constrained from a budgetary standpoint. Adding to these pressures felt at the state transportation agencies is the issue of their workforce—with its many faceted challenges. Among the most critical is how to equip state employees with the skills necessary to operate in this post-interstate era of transportation delivery. Thus the genesis of the subject for this research--“In-Service Training Needs for State DOTs.”

This project considered the subject of “in-service” training from two perspectives. First, what skills would be necessary for professional employees and second, those required of technicians. In addition, finding the optimal means for delivering this training was also the subject of this study. In order to assess these critical elements of “in-service” training, three groups of individuals from state DOTs were queried in unique formats as follows:

- State Human Resources Directors-Facilitated session at the Subcommittee on Human Resources and Training
- State Training Managers-phone survey to 26 states
- State CEOs-Discussions held at the summer 2005 regional meetings

All told, the information gathered through this research netted very interesting information on the topic of “in-service” training.

This report will serve as a guide for state DOTs in their efforts to provide professional development training for their employees in all classifications and positions. It reflects important trends in core and complimentary skills as well as areas relating to training management, and delivery. The degree with which “in-service” training efforts conform to these patterns will determine how well state DOTs are prepared to face their transportation mission into the future.

Significant conclusions drawn from this research effort include the following:

Train Technicians and Recognize Them as Para-Professionals Many technicians are performing similar duties to those of their professional counterparts. This trend has been going on for many years and this research is formal recognition that technicians in many cases must be given the same “in-service” training as the professionals in order for them to function effectively in their positions.

Program/Project Management as a Core Skill Nearly all of the states have indicated a need to improve their program/project management skill set among their employees. The workload is demanding that these individuals have the abilities to manage outside and internal resources, right of way procurement, finance issues, technical processes and the like on increasingly complex projects. The ability to employ sound program/project management skills will be crucial to the success of these agency efforts.

Migration of Skills From Complementary to Core A major finding of this research is the trend for certain skills to migrate from the complementary category to core needs. Years ago professional and technical employees would never have seen facilitation, consensus building or public relations skills in the core area of their job description. Today, these and other “soft” skills have found their way from the complementary to core side of the ledger.

Training Management Most surprising among the findings was the fact that most training programs in the state DOT’s have some measure of a central focus but that the overall training effort is widely dispersed and decentralized. This lack of a central focus inhibits coordination, collaboration and effective use of training resources to benefit the overall agency effort. Better leveraging of scarce training resources—both financial and human could occur with a hard look at how training is organized in the state DOTs.

Traditional Training Delivery Must Give Way to More Effective Approaches Traditional training delivery will largely be replaced by programs that provide just in time training, tailored training for individual needs and training that provides more “soft” skills to state employees. Technology will have a strong role in future training deployment but some classroom delivery will still be used into the future.

Partnerships With Other Organizations/Institutions Emanating from this research was the strong interest in having greater collaboration between state DOTs and other institutions including AASHTO, FHWA and professional organizations. In addition, more effective and formal relationships with community colleges, university transportation centers and others are seen as valuable for effective “in-service” training delivery.

Making The Case For Training One of the challenges for CEOs is the fact that states have historically had a hard time making the cost benefit case for training resources. States would do well to develop a model that could further the discussion and justification for additional resources for training in the DOTs.

Leadership Top to bottom, leadership training is recognized as a need for every state DOT. Offering leadership training to new leaders and those more senior reflects the on-going nature of this particular skill requirement. This is one

of those continuing efforts that must be consistently offered and routinely modified to meet the changing needs of state DOTs.

Global Issues Professionals need to learn about public finance, public/private partnerships, the global economy, advances in technology, supply-chain economics, research and development, and other areas. When and how to give these skills to leaders is an important inquiry that will impact “in-service training in the state DOTs. Effective delivery will be important for leaders to function in our fast changing world.

The “Softest of the Soft” Perhaps one of the most challenging areas of “in-service” or professional-development training is the need to create leaders who are skilled at innovation and the creative-thought process. These are skills that can be taught to some degree, but not in a traditional format or training environment. The current demands placed upon state DOTs does not allow them the luxury of having leaders who are not innovative in finding solutions that may be beyond past norms. They must learn from the past, but create solutions to problems in the present.

The opportunities for state DOTs to improve their approach to “in-service” training are many. That is not to say that the current approach has not been or is not good. Rather, this research is intended to be a forward-looking approach to “in-service” or professional development training needs in state DOTs and, as such, the conclusions and the consequential actions arising from this report should be seen as enhancements or a maturing of what is already in place. To continue down the existing path will yield disappointing outcomes and will not address the new world confronting state DOTs. Changes in approach, based on the conclusions of this report, will bring about the improvements necessary for states to meet their mission requirements.

CHAPTER ONE

INTRODUCTION

BACKGROUND

For much of the last century, state departments of transportation (DOT) have collectively endeavored to build a world-class transportation system to move people and goods within their state borders and across the country. The celebration in 2006 of the fifty-year anniversary of the construction of the Interstate Highway system is a milestone for our nation and a tribute to the many men and women in the public and private sectors who contributed to that achievement. Today, the fifty states and the District of Columbia operate and maintain over 663,000 miles of roads and highway which allow an unprecedented level of mobility for the citizens of this nation (FHWA, 2001). On any given day, hundreds of millions of vehicle miles of travel are logged on just the state transportation systems alone.

In spite of these noteworthy achievements, the dawn of the 21st Century gives no moment for pause for state transportation officials. New challenges are being faced every day, with others looming on the horizon. These include an ever-increasing demand for transportation services, customer expectations of system performance, and a funding pool that seems to grow more inadequate each day. The American Association of State Highway and Transportation Officials (AASHTO) reports that it will take some \$92 billion per year to *maintain* the current state transportation system and a total of \$125.6 billion per year to *improve* it as desired (AASHTO, 2002). The recently passed highway authorization bill, the Safe, Accountable, Efficient, Transportation, Equity Act: A Legacy for Users (SAFETEA: LU), while providing a record amount of funding for transportation, falls significantly short of this objective.

Congestion has become a major issue facing state DOT's. Urban areas, where most of the population growth has occurred over the last fifty years, have seen congestion increase at an alarming rate. The Texas Transportation Institute (TTI) reported in their 2005 Mobility Report that in 2003 Americans experiences 3.7 billion hours of delay due to congestion. In that same report, they note this represents a value of \$65 billion in time and a consumption of 2.3 billion gallons of fuel (TTI, 2005). The mobility demands of American society are stretching the national network of roads and highways to limits never anticipated in the past.

In the face of these daunting challenges, state DOT's are expected to deliver on the demands of their customers for more and improved service. While this has never been easy, the task has grown even more difficult with the workforce issues that confront transportation leaders across the country. When the state CEOs were surveyed in 2004 concerning the update of the AASHTO strategic plan, "Training and Workforce" issues emerged as one of their highest

priorities. Also included in their priority of issues is “in-service” training for employees within their agencies. For the purposes of this research, “in-service” training is defined as that training provided to employees both to maintain their current skills and to provide new skill development to meet changing job requirements or agency needs. This training is provided either in-house or through outside contractors or providers. Sometimes it is referred to as “professional development” and these terms will be used interchangeably in this report. “In-service” training does not include education or training that an individual is required or encouraged to have prior to becoming an employee, such as that which would be provided in a post-secondary education environment.

The response from the state CEOs is not surprising given the obstacles they face in staffing an agency with qualified individuals to deliver on critical services. In addition, there are other factors that drive them to see “in-service” training as an important component for their success. They are:

- The retirement of managers and technicians with many years of experience, and the need to replace them with employees with far less experience. More training is needed to enable these individuals to handle their new responsibilities.
- Downsizing of agency staffing levels coupled with more outsourcing for key products and services requires a changing role for state personnel. Instead of supervising staff to do work directly, they need to be trained in skills such as contract negotiation, contract supervision, and quality assurance to accomplish the same mission.
- The mix of skills required of state DOT employees has changed over the years. Training is now required to enable staff to communicate better in public meetings, address the growing complexity of environmental requirements, and perform their design functions using new approaches such as Context Sensitive Solutions. These skills were not likely to have been developed in a post-secondary education environment.
- Technologies which can increase state DOT productivity and effectiveness are changing and growing more complex. While valuable in their contribution to the delivery of state services, training is required so that needed skills can be mastered and the full value of these technologies can be leveraged towards serving the DOT’s customers.

PROJECT SCOPE AND OBJECTIVES

The purpose of this project is to perform accelerated research into the topic of “in-service training for both professional and technical personnel.” In order to achieve this objective it was determined that inputs were needed from three distinct groups of individuals within the state DOT’s. They are:

- Human Resources Directors
- Training Managers
- Chief Executive Officers

Inputs from each of these groups, aggregated and analyzed, are seen as the means to truly understand what state DOT's are facing in the way of professional development needs. In addition, an understanding of the relevant gaps that exist between current programs and the desired future efforts was seen as an important outcome. Research for this project was conducted in a manner so as to address these objectives.

Ultimately, at the conclusion of this study, AASHTO and its member states believe the results will impact a number of initiatives—some of which are as follows:

- Assist AASHTO in delivering on the mandate received from their Board of Directors under Goal 3 D of their Strategic Plan, “Expanding training opportunities and array of offerings.”
- Assist the states in correlating their in-service training initiatives with their greatest needs.
- Assist the Council of University Transportation Centers (CUTC) in its efforts to craft training programs that better match state DOT needs.
- Assist the Local Transportation Assistance Program (LTAP) in better focusing their services.
- Assist the various state pooled-funded efforts, such as the Transportation Curriculum Council (TCCC), the National Center for Pavement Preservation (NCPPE), and others, in better targeting training and outreach services.

In addition to determining training needs and assessing where gaps exist in meeting those needs, it was also desired that this research effort analyze training delivery methods that are currently being employed, as well as those which would be used for future training delivery. Transportation leaders, as their human resources and training professionals all realize, know that training delivery will be an important element to effectively addressing this critical need in the state DOT's. Consequently, the pedagogical dimension of “in-service” training was also explored throughout of this study.

STUDY PROCEDURES

Research for this project was performed along four avenues. The first involved a thorough review of the available literature on the subject of “in-service training needs for state DOT's.” A summary of the literature reviewed for this updated research is found in Chapter 2 of this report.

Second, the state DOT human resources directors participated in an engaging session at the annual meeting of the Subcommittee on Personnel and Human Resources in April 2005 in Denver, Colorado. At that time, the topic of state DOT “in-service” training needs was explored for both professional and technical personnel within eight areas that typify their organization. They are:

- Field Engineering
- Design Engineering
- Program Management
- Program Development
- Operations and Maintenance
- Finance and Administration
- Technology and Technical Support
- Other (Specify, e.g. Motor Vehicle Division, Drivers Licensing, Ferries, Transit, etc.)

HR directors were asked to identify the core and complementary skills associated with both professional and technical positions within each of these operational areas of the state DOTs. Once the skills were determined, these same individuals were asked to assess current and future delivery methods and means.

The third element of this research focused on surveying the training managers in the state DOTs. This was done through a telephone interview whereby representatives from the states were queried about their training needs and delivery methods. Those interviewed were largely from the training manager/provider ranks of the states.

Finally, a third group was asked for input: the respective state chief executive officers. This was accomplished through facilitated discussions during the summer of 2005 at the respective regional meetings (Western Association of State Highway and Transportation Officials-WASHTO, Mississippi Valley Conference, etc.) of the state DOTs. Each CEO’s perspective was seen as critical to formulating the overall plan of workforce training and preparation for future responsibilities. These discussions focused mainly on the “in-service” training needs and less so on the delivery methods.

SURVEY RESPONSE RATE

While it was originally anticipated that a typical electronic or paper survey would be conducted by the researchers, the complexity and nature of the topic area required that the investigation be done through oral interviews. Ultimately, the survey developed for this study was conducted via telephone interviews and included responses from 26 state DOT’s.

The instrument utilized may be found in Appendix A, while the summarized responses from each state are included in Appendix B. The aggregate findings of these interviews are reviewed in Chapter 4. In all, the survey was a valuable means for gathering information critical to this project.

ORGANIZATION

This report is organized into chapters to facilitate presentation of both the information gathered and the conclusions and recommendations made.

The following constitutes a summary of the seven chapters and their content:

Chapter 1—Introduction This chapter includes a review of the purpose of this research, provides an overview of the issue of “in-service training needs and delivery methods,” and establishes a foundation for the discussion presented in the remaining chapters. A short discussion of the research process is also included.

Chapter 2--Literature Review A summary is presented of the literature that was analyzed for relevancy and content for this research.

Chapter 3—The HR Director’s View This chapter considers the inputs received from the state DOT HR Directors during their Subcommittee on Human Resources and Training meeting in Denver in April 2005, as well as some individual interviews.

Chapter 4—Survey of State Training Managers This chapter reviews the current state of practice in providing training to meet in-service needs of state DOT’s as determined through the research survey conducted for this project.

Chapter 5—The State CEO’s View This chapter summarizes the information received from the state DOT CEOs as they were queried on their expectations for meeting training needs for their employees.

Chapter 6--Conclusions. Conclusions are offered concerning the research conducted for this project.

Appendix A --State DOT Survey Instrument

Appendix B --State-by-State Survey Summaries

Appendix C – AASHTO Subcommittee on Personnel and Human Resources Handout

Appendix D--CEO's Comments

CHAPTER TWO

LITERATURE REVIEW

Addressing the “in-service” or professional development training needs of state DOT employees is a major challenge facing the transportation community today. Viewed in perspective, it is part of larger workforce issues with which both the public and private sectors must deal in meeting their specific organizational objectives on a daily basis. These workforce issues include retirement trends, recruitment and retention concerns, training requirements, outsourcing dynamics, and many others. Although some of the literature speaks specifically to “in-service” training needs, most available material merely provides today’s leaders with background and context for the issue. In fact, much of the literature addresses anticipated “in-service” training needs in more of an oblique manner rather than focusing directly on content and curriculum. Thus, the literature review for this project mirrors this contextual look at “in-service” training as a part of more inclusive workforce issues.

The Transportation Research Board has published a number of related documents on the subject of the transportation workforce, its changing nature, and how its characteristics will impact the future delivery of transportation-related services to the people of our nation. Included in this array of publications is their report, *Transportation Professionals: Future Needs and Opportunities* (TRB/1985) and a synthesis, *Innovative Strategies for Upgrading Personnel in State Transportation Departments* (Poister/1990). Both addressed a wide variety of issues, including the recruitment and retention of state employees and factors relating to developing a stable workforce. In its Special Report 220, *A Look Ahead--Year 2020*, there is offered significant context to the growing concern with workforce development and how state DOTs will address this critical component in their organizational strategies. In his contribution to that work, Bruce D. McDowell asserts that future needs will require transportation institutions and programs to change and describes an environment wherein the traditional role of state DOT employees and their normal work activities will be different—thus leading the reader to surmise a need for different skills sets in the future (TRB/1988).

Understanding “in-service” training needs requires a comprehension of the prevailing dynamics in the workplace within both the public and private sectors. The nature of organizations is changing, and the way work is done today is different from twenty years ago. Procedures that were productive and enabled companies and organizations to be successful in the past will not necessarily deliver the same results in the future. In his thought-provoking book entitled, *The Future of Work*, Thomas W. Malone describes the kinds of organizations that will be successful in the future. They

are more decentralized, with decision-making authority pushed out to managers and employees who are dealing on the front lines of product development and customer service. Malone defines decentralization as “the participation of people in making decisions that matter to them.” He suggests that future organizations will be described in terms such as self-organizing, self-managed, empowered, emergent, democratic, participative, and people-centered (Malone/2004). While some may suggest that these descriptions apply only to private entities, there is more and more evidence that public agencies, including state DOTs, must also emulate such models to be successful in the future.

The demographics of the workforce are also having a significant influence on the evolution of state DOTs, and any “in-service” training program will have to respond accordingly. Past studies have shown that transportation-agency employees are aging and retiring at an alarming pace and that younger, less-experienced employees have to step up and fill vacancies created in the process. In a recent study it was found that over one-third of those employed in state DOT senior management alone were eligible to retire immediately, with another 10% being eligible within three years (Warne/2005). The trend toward employee retirement is one that is not reserved only for members of management, but is a factor throughout state DOT organizations.

Age is not the only demographic influence impacting how a state DOT views its “in-service” training needs. The Hudson Institute examines this issue in detail in its publication entitled, *The Workforce to the Year 2020*. Therein the labor force of the year 2020 is described as one being comprised of equal portions of men and women, with white, non-Hispanics comprising 68% of that workforce (down from 76% today). The relative percentages of Hispanics and Asians are predicted to increase while those of African-American descent will remain the same. Immigration will be a factor in the changing composition of our nation’s workforce, bringing greater numbers of individuals not born in the United States into positions currently held by long-time employees at the DOTs (Hudson/1997).

In his book *Workforce 2020*, Richard Judy offered his predictions for how the American workforce will change over the coming years. Judy confirms the aging and demographic issues raised in the previously cited Hudson report. He also noted that while now there are four workers for every retiree, there will soon be only two. Judy predicts that, “the aging of the U.S. workforce will be far more dramatic than its ethnic shifts” (Judy/1997).

Changes in the workforce will also be driven by the makeup of the jobs themselves. Overall, professional and related fields are expected to grow faster than other occupational areas in the coming years, gaining 7 million workers. About 6-7% of these new jobs will be in engineering and management services. Not unexpected is the prediction that

the number of government jobs will increase more slowly in comparison to those in the private sector (Occupational/2001).

In one article the term “employer of choice” was used to describe an organization that is able to attract top-performing employees. This “employer of choice” must provide an employee with opportunities for learning, growth, and challenge. It was noted that top performing employees also switch jobs more often because of boredom and their need for more opportunities for growth. This “job switching” should not be interpreted as an act of disloyalty to an organization; rather it is a reflection of interest in new challenges. An “employer of choice” will be flexible with its employees, allowing them to balance their work and family life to create an atmosphere of greater productivity (Society/2000).

In her scan, *Managing Change in State Departments of Transportation*, researcher Cynthia A. Weatherby suggests that the recruitment and retention of IT professionals is a major crisis for the DOTs. She offers that states may be better off training individuals within their own organizations as an investment and retention strategy to deal with this problem. In addition Weatherby recommends identifying a succession plan for IT professionals that allows them to progress and grow without leaving the organization (Weatherby/2001).

Staffing within state DOTs is something that is of concern to virtually every agency. In a study published through the National Cooperative Highway Research Program (NCHRP), it was found that 52% of the agencies anticipated a static workforce in terms of the number of full-time equivalents (FTE), 35% felt they would see a decline, and 19% thought they would realize an increase over the next five years (Warne/2005). With the passage of the “Safe, Accountable, Flexible, Efficient, Transportation Equity Act: A Legacy for Users” (SAFETEA:LU), the states will receive record amounts of funding from the federal highway trust fund (HTF). Thus, it would seem counterintuitive that staffing levels would be declining or even remaining the same within state agencies due to an increasing workload.

In order to accommodate this noted increase in workload among the state DOTs, there has emerged a growing trend towards outsourcing activities, projects, and even entire programs to the private sector. This conscious choice to maintain a specific staffing level while turning to private engineering consulting firms for both basic and specialty work is one that is growing every year. Past research noted that states saw an increase in outsourcing of nearly 30% of their workload from 2002-2004 and anticipated this trend would continue (Warne/2003). This movement towards having private-sector resources assist state DOTs in delivering their programs has much to do with the identified need for DOT employees to receive more project/program management training as part of their core “in-service” curriculum.

Another dimension of the staffing issue at state DOTs is the twin challenge of recruiting and retention of qualified individuals to work in these agencies. Efforts to recruit the finest individuals into state service are successful when they focus on employee benefits, professional opportunities, and stability of employment. Many discuss the recruitment pipeline that brings people to state DOT positions as if it were the singular source of qualified individuals. Rather, those close to the issue of recruitment for these transportation agencies realize that it is a conduit with many branches, i.e., and individuals come to state service from many different directions. On the retention side of the discussion it was found that these same factors were important to employees as they chose to stay in state service or chose to come back to the state DOTs after leaving their public positions (Warne/2003).

The nature of the workload at state DOTs is changing. This shift is brought about by several factors—all of which contribute both individually and in concert to the challenge of equipping state DOT employees with the skills to meet the challenges of their specific positions. The first factor is the change from an “Interstate-building” organization to an “operate and maintain” entity. While there are still major-capacity projects being constructed around the country in many urban areas, the vast majority of the effort currently being expended by the states is focused on operating and maintaining their current network of roads and highways. This transition from an engineering/construction-centric activity to one that seeks efficient mobility has brought about many changes in the state DOTs. Although the need for *construction* professionals/engineers and technicians has not disappeared, the skill set that is required to *operate* a complex, existing transportation system on a 24/7 basis is different.

In addition, there are many other factors influencing the “in-service” training requirements for state DOT employees. They include demographic issues relating to the makeup of the workforce with its gender and age attributes, immigration trends, retirements along with issues relating to recruiting and the changing nature of organizations, and the nature of the work itself. In the aggregate, these factors are driving an “in-service” or professional development agenda that is much different today than it has ever been in the past. The states must respond to these dynamics or risk failing in the delivery of basic services to their customers. Identification of the training needs that will equip state employees to perform their duties in this dynamic environment will be the key to operational success for these agencies in the future.

CHAPTER THREE

THE HR DIRECTOR'S VIEW

BACKGROUND

There were three distinct groups of individuals whose respective insights into, and perspectives of, this important topic were sought in developing this report. The first group was the human resources directors for the state DOTs. These professionals were seen as having key insights into the overall workforce issue based upon their formal education, other training, and work experience. In addition, their network of peers in the state DOTs as well as their colleagues from the private sector, provides them a unique perspective on the subject of in-service training.

An opportunity presented itself to sample the collective wisdom of the state DOT human resources directors while they attended the annual meeting of the AASHTO Subcommittee on Personnel and Human Resources in April 2005. In doing so a half day of the agenda was dedicated to providing individual and group input to this project on present and future “in-service” training needs of their agencies.

In order to best utilize the time during the subcommittee’s meeting, briefing materials were prepared to lay the groundwork for this discussion. These documents can be accessed in Appendix C. Essentially, the group divided its time into two distinct discussion efforts, the first being an overview of core and complementary skills, and the second focusing on training delivery under both current and optimal circumstances into the future. The outcomes of these two discussions will be covered in the remaining sections of this chapter.

CORE AND COMPLEMENTARY SKILLS

The distinction between core and complementary skills is important in the process of research into “in-service” or professional-development training as well as in how the results are viewed. For the purposes of this project, core skills were defined as those abilities that an individual must have in order to effectively accomplish the duties of his job. Most would be non-negotiable in terms of an individual’s ability to even qualify for the position. On the other hand, complementary skills would be those that, while valuable and useful, might not be requisite for obtaining a position or for even being moderately effective in the role. This distinction or the lack thereof, became a major issue and finding of this research.

While many would initially expect there to be a strong emphasis on engineering positions in a state DOT, there is in fact significant diversity among the types of position classifications that make up any given agency. Regardless of the state, an agency will have engineers, accountants, technology professionals, attorneys, and many others among its ranks

of professional employees. Those in non-professional positions, whether materials testing personnel, mechanics, clerical workers, or others, make up a large segment of the agency's basic staff and far outnumber those in the professional ranks. This diversity, while essential for the delivery of transportation services in any given state, only increases the complexity of dealing both with the workforce issue and, more specifically, with "in-service" training. Early in the development process of this research project, it was determined that the overlooking of these non-engineering positions would constitute an oversight of a major component of the state DOT workforce, and would prevent a proper addressing of future training needs.

For the purposes of the discussions held at the AASHTO Subcommittee on Personnel and Human Resources, the specific inputs were divided into two facets. The first input sought was by organizational structure within the state DOT. While not all agencies are homogeneous across the country, there are many similarities among these organizations that can be generalized for the purposes of this research. Eight groupings or divisions of typical state DOTs were identified and presented to the Human Resources Directors. They are:

- Field Engineering
- Design Engineering
- Program Management
- Program Development
- Operations and Maintenance
- Finance and Administration
- Technology and Technical Support
- Other (e.g., Motor Vehicle Division, Driver Licensing, Ferries, Transit, etc.)

While not every agency is organized precisely as the next, each has some element of all of these groupings. The last one, "Other," was added to cover all of the additional functions that are found in some agencies but which are not necessarily common among the majority.

The second distinction made during the discussion of core and complementary competencies was between professional and technical positions. Again, in any given activity within a state DOT there are often many technical positions for every professional found on the organizational chart. For example, typically, an individual serving as a Resident Engineer on one or more highway construction projects is probably a registered professional engineer with a degree in civil engineering. He or she may be the only degreed engineer in their work unit. However, there is generally

a larger group of highly trained technicians who perform critical work on the same project, but not as university-trained professionals. This being the case, it was thought to be important that “in-service” training needs of technicians found within these divisions be analyzed as well.

The inputs received from the HR Directors were insightful and provided an interesting perspective on the research topic. A brief summary of each of area will follow for both professionals and technicians. The timeframe for gathering this information was rather brief, given the enormity and complexity of the task. In addition, it is the author’s observation that during these discussions the participants often skipped over the “obvious” and focused on skills and abilities that were new or perhaps would otherwise be overlooked. Thus, the reader is cautioned in reviewing the content of the tables that follow not to judge them as being incomplete given the fact that the “obvious” may have been left out by some respondents.

Field Engineering

Field engineering encompasses those activities that are largely focused on the actual construction of highway facilities. For example, the Resident Engineer previously mentioned would fall into this category of employee. Featured in Table 1 is what the HR Directors offered as their summary of core and complementary skills for these Field Engineering positions:

| | | |
|----------------------------|---|--|
| <p>Professional</p> | <p>Core: Contract admin-record keeping Erosion control-Storm Water Pollution Prevention Program (SWP3) Hydraulics Basic design Structures Environmental sensitivity Critical path method (CPM) Facilitation skills Problem solving Maintenance of traffic Relationship with contractors Contract management Conflict management Financial accountability</p> | <p>Complementary: Safety ethics HR skills Negotiation skills Land-use planning Work planning Traffic engineering Risk management Maintenance Technology skills Intelligent Transportation Systems PR skills Public outreach Negotiation skills Written communication Interpersonal</p> |
| <p>Technician</p> | <p>Core: Materials testing Lab certification Project documentation Contractor relocations Basic design Para-engineering Global positioning systems (GPS) Surveying</p> | <p>Complementary: State laws and regulations People skills <ul style="list-style-type: none"> • interpersonal • communication • negotiation/mediation Financial/budget Government funding and processes Human resources and supervision</p> |

| | | |
|--|---|--|
| | Basic computer skills Hot mix asphalt certification Technical certifications Safety Erosion Public relations Ethics Contract administration Environmental justice Maintenance of traffic Construction inspection Conflict management Environmental Quality assurance | Policy Performance measurement Self-development and leadership Public outreach Negotiation skills Written communication Interpersonal skills |
|--|---|--|

Table 1: Field Engineering Skills

There are a number of key observations emanating from this list. For example, note that many of the core skills identified for the engineer are also on the list for the technician. This may largely be attributed to the fact that, in many state DOTs senior technicians often perform duties that are similar in nature to their engineer counterparts. This trend is not unique to highway agencies or even public service. For example, a growing component of the medical field is the role of a physician’s assistant or PA, someone who performs many of the basic functions or duties of a certified physician but with some specific restrictions.

Design Engineering

Design engineering consists of those activities associated with the actual design of transportation facilities. These employees are typically found in bridge or roadway design units of highway agencies and comprise engineers and technicians who are using such tools as computer-aided design and drafting (CADD). Some might suggest that their only product is the plan sheets that are used to build projects, but these individuals perform many other functions in relation to the pure engineering design activity. For example, they often conduct public meetings to seek input or share their designs. Additionally, they are charged with incorporating provisions and commitments found in environmental documents into their designs. From the HR Directors, the data found in Table 2 was provided for Design Engineers:

| | | |
|---------------------|--|--|
| Professional | Core: Project management Contract management Value engineering Context Sensitive Solutions (CSS) Environmental Right of way Intelligent Transportation Systems (ITS) Alternate transportation modes Design awareness | Complementary: Leadership Negotiation Public outreach Interpersonal skills Team concept Public speaking |
|---------------------|--|--|

| | | |
|-------------------|---|---|
| Technician | Core: Survey Blue book Environmental justice Economic impact Federal/Native American issues Context sensitive solutions (CSS) Maintenance issues Balance between technical and environmental solutions Environmental Computer skills Computer Aided Drafting and Design (CADD) Design standards Plans, specifications and estimates (PS&E) Value engineering Structures advanced Hydraulics advanced Traffic engineering Environmental engineering Intelligent Transportation Systems (ITS) Maintenance Surveying Teamwork skills Constructability Finance PR skills-marketing Land use access management Material-testing basics Geotechnical Cultural awareness Facilitation Negotiations Leadership Management | Complementary: Title VI Budget Political savvy/involvement Partnering with internal units Teaming/collaboration Soft skills <ul style="list-style-type: none"> • Consensus building • Negotiation • Facilitation • Listening Contract administration Project management Leadership Negotiation Public outreach Interpersonal Team concept Public speaking |
|-------------------|---|---|

Table 2: Design Engineering Skills

The list of core skills for the design technicians, above, is noteworthy in that it is reflective of how these individuals function within a state DOT. In addition, just as with the field engineering positions there is significant overlap between the skills sets for the professionals as well as the technical positions.

Program Management

Program management was the third area considered in relation to core and complementary skills. It is defined as those activities that are associated with the oversight and management of groups of projects or activities, and would be seen as work one step above project management. As the nature of state transportation programs changes towards larger projects, groups of projects approved by referendum or by legislative action (as well as more complex and long-term initiatives), effective program management is becoming increasingly important to state agencies.

There are a number of examples of types of programs across the country which requires the skills inherent in effective program management. These programs can be divided into two classes: those managed with state forces and those that are managed using outside resources with overall management oversight provided by a small (sometimes single-person) cadre of state employees. They include such programs as the South Carolina 27/7 Program, Louisiana’s TIMED program, and Arizona’s MAG Freeway program. Other examples of such programs are the newly established \$1.6 billion GARVEE program in Idaho, and Washington’s “nickel” program wherein their newly passed five-cent-per-gallon tax increase will fund projects all over the Evergreen state. Regardless of the type of program, the trend in state DOTs is towards the need for more individuals with effective management skills. Table 3 shows the inputs from the state DOT HR directors with regard to Program Management personnel.

| | | |
|----------------------------|---|---|
| <p>Professional</p> | <p>Core: State/federal regulations State strategic direction Management skills Budget/finance Legislative process Human resource management Big picture view of the program Engineering Management Administration</p> | <p>Complementary: Vision Contract management Governance process Leadership Finance management budget Negotiation skills Political awareness Multi-modal perspective Business acumen Leading staff Performance measurement</p> |
| <p>Technician</p> | <p>Core: Multi-tasking Asset management Project scheduling Program Management Process Personnel skills Investment management Strategic planning Performance measurement Laws and regulations Political savvy Financial/budget</p> | <p>Complementary: Audit skills Ethics Conflict management Conducting public meetings Team building Census building Negotiation skills Facilitation skills Public relations Facilitation Media relations Soft skills package Influencing Self-development Leadership</p> |

Table 3: Program Management Skills

Program Development

Within each state highway agency lies an organization composed of individuals who do the short and long-term planning of projects for their state. Often referred to as the “planners,” these individuals perform the tasks necessary to

prepare the agency’s five-year, statewide transportation improvement program (STIP) as required by law. In addition, they also perform specific analyses related to the environmental process, manage federal and state cash flows and funding strategies, and perform the initial analysis of projects necessary to develop concept reports for later use by designers. In many cases the skills required to function effectively in the program-development area of an agency are different from those necessary for other positions. Table 4 reflects the input from the members of the AASHTO Subcommittee on Personnel and Human Resources.

| | | |
|---------------------|--|--|
| Professional | Core: Statistical analysis Planning-project scoping R/W acquisition Land use Political awareness Environmental planning Funding sources Investment strategies PR/marketing Ethics Policy analysis Modeling technology skills Economic development/impact | Complementary: Vision Contract management Governance process Leadership Finance management-budget Negotiation skills Political awareness Multi-modal perspective Business acumen Leading staff Performance measurement |
| Technician | Core: NEPA State economics Analysis/collection of data Funding State demographics/population Alternative modality Safety/security Writing skills Presentation Program measurement | Complementary: Title VI Consensus building Facilitation Budgeting Computer/technology Fed/state/legislative process Self dev/leadership Multi tasking Asset management Project scheduling Personnel skills Investment management Strategic planning Performance measurement Laws and regulations Political skills Financial/budget |

Table 4: Program Development Skills

Operations and Maintenance

As the transportation systems of our nation mature and transition from the intensity of the interstate construction era of the late twentieth century, agencies are likewise changing their methods of doing business. In many cases this is typified by an increased focus upon maintaining the existing road and highway network, as opposed to the past heavy

emphasis upon adding capacity to the system. Where efforts once were weighted towards building large projects many state DOTs have now moved towards determining how better to manage and operate their current system in order to maximize its utilization and throughput. This “operations” approach requires a different view of transportation systems, and this change is reflected in the core and complementary skills identified by state HR directors, as found in Table 5.

| | | |
|----------------------------|---|--|
| <p>Professional</p> | <p>Core: Ethics Materials testing Traffic engineering Heavy-equipment operations Fleet management Asset management Traffic control Safety Public relations Customer service Budgeting/financial management Technology applications HR management Resource management Drainage/runoff Erosion control Construction Maintenance/technical engineering Departmental overview Computers and technology Contract management Environmental issues Purchasing Inventory control Equipment management</p> | <p>Complementary: Legal issues Collaboration across agencies Communication with the public Politics/political awareness Soft skills On-the-job training Self development Leadership</p> |
| <p>Technician</p> | <p>Core: Supervisory/HR Understand other disciplines Crisis management Performance measures Traffic management Process management Safety Equipment Procurement Training Community relations</p> | <p>People skills Communication skills Time management Work planning Risk management</p> |

Table 5. Operations and Maintenance Skills

Finance and Administration

One of the critical areas of a state DOT’s organization includes the functions that handle the finance and administration duties for the agency. Often left out of training discussions, these entities include many employees who

need training just as their engineering counterparts do. This broad category of administrative and financial classifications includes employees in many of the following functions within a state DOT:

- Finance
- Comptroller
- Procurement
- Legal
- Administrative support
- Training
- Human resources
- Public relations
- Risk management
- Accident statistics/analysis

This listing is by no means comprehensive but is illustrative of the diversity of employee classifications that fall within this functional area of a state DOT. It is this broad spectrum of positions and their lack of homogeneity of duties performed that makes training such a group of employees all the more difficult. However, to leave them out of the discussion of “in-service” training would be to ignore a large element of a DOT’s employee base. When the state HR directors were queried about core and complementary skills for this group of employees, they gave the responses delineated in Table 6.

| | | |
|---------------------|--|--|
| Professional | Core: Ethics Basic math skills Leadership skills Resource management Finance Procurement methods Financial systems management Cost accounting Legislative process Contract management All HR functions Asset management Auditions Budgeting | Complementary: Customer service Project management Partnering Soft skills package Facilitation Meeting management Statistical analysis Continuous learning Succession planning |
| Technician | Core: Budget Creative finance | Complementary: Knowledge of tech – IT Knowledge of fed aid funding |

| | | |
|--|--|--|
| | State/fed policy and funding Long-term budget planning People skills/communication Politics Legislative process Market Computer technology Legal Strategic planning/abstract thought/vision HR/EO training (safety) Succession planning, organizational development Labor relations | Legislative process-state and fed Alternative funding sources Asset management Procurement Contracts/billing Accounting Performance measurement Human relations Safety and health Employer relation Workforce planning Complementary training Knowing strategic plan |
|--|--|--|

Table 6. Finance and Administration Skills

Caution is urged when looking at the results found in Table 6 since this particular group of employees is so diverse and the specific skill sets offered during this discussion were generalized in a significant manner. Clearly a more specific analysis would be required for individual classes of employees in this area.

Technology and Technical Support

A growing category of state DOT employee classification consists of those jobs that have some relationship to general technology, technical support of computer-software systems, or the actual hardware on which those systems operate. The proliferation of local- and wide-area networks, internet tools such as web sites, and advanced project delivery products in the computer-aided drafting and design arena are all making technology support a vital function within a state DOT. As with the finance and administration area, employees within these classifications are often overshadowed by the emphasis on engineering-related positions. This oversight can occur in spite of efforts to continuously update this key group of employees in their respective skill sets. In fact, given the fast-changing nature of their particular realm of competencies, this classification category may need the most emphasis in a discussion of “in-service” training. Table 7 shows the skills identified for this group of employees.

| | | |
|---------------------|---|--|
| Professional | Core: Continuous learning Engineering basics Organizational core mission Customer-service perspective Finance/revenue sources Needs assessment | Complementary: Marketing |
| Technician | Core: Responsive, cutting edge, nimble Business understanding Hardware, software and evaluation of technology | Complementary: Soft skills package Partnering/collaboration Purchasing knowledge Customer service |

| | | |
|--|--|--------------------------------|
| | Write documentation/training manuals Contract-proposal development and evaluation Negotiation Contract management Budget | Self-development Leadership |
|--|--|--------------------------------|

Table 7. Technology and Technical Support Skills

Other

The final category of agency activity has been defined as “Other.” This grouping was created to capture the myriad other functions within a particular or handful of state DOTs that are not common to all fifty states, Puerto Rico and the District of Columbia. Included are such activities as drivers license issuance, motor vehicle registration, transit, ferries, etc. It is difficult to design or develop an “in-service” curriculum that would cross so many positional classifications, but to ignore such a large segment of each agency’s staffing component would be unwise in today’s environment. Thus, the final area where the HR directors were asked to identify core and complementary skills covers a broad range of activities and is necessarily general in nature. Their responses included many of the common skills noted previously in this chapter, including the following:

- Communication skills
- Technology skills
- Resource management
- Finance
- Ethics
- Leadership
- Contract management
- Procurement
- Political awareness

The breadth of positions falling into this area of state DOTs is such that little depth is possible without looking at the skills on a position-by-position basis. That said, the contents of Tables 1-7 offer some insights into the expectations that will be generally be required of the included positions, with the exception of the technical skill sets noted.

In some cases, there are core or complementary skills that the HR directors felt applied across all classifications and they listed them as such. Table 8 reflects these:

- Communication/interpersonal
- Teamwork
- Customer service
- Respect for others
- Ethics
- Workplace safety
- Mission/goals/values
- What organization does
- Work ethic/performance
- Basic business systems (payroll, travel, IT)
- How they fit into government
- Transportation finance

Table 8. Common Core Skills for all Positions

The HR directors were very engaged in defining these core and complementary skills for all eight areas of a state DOT organization. All of the tables give insight into how positions are changing and the relationship between the core and complementary skills necessary for each position.

TRAINING DELIVERY

It is not sufficient to know what skills are needed to fulfill the “in-service” training needs for a state DOT. It is also essential to be able to deliver that training to the right individuals at the right time and place in order to make training the pivotal activity that it should be within an agency. The second part of the discussion with the state DOT HR directors consisted of asking for their input regarding optimal methods of delivering training today and of developing an unconstrained model for doing so. This unconstrained model was offered to free the HR directors from encumbrances by typical inhibitors such as budget, technology, political will in the executive or legislative branches, or any other issue. The desired focus was upon information that would provide an optimal way of delivering training, not about a model that would be limited in its scope or effectiveness.

| | |
|---|--|
| Rotation Classroom On-line – internal On-line – external Tuition assistance Time off work On-the-job training Conference/seminar Special project assignments Video conference Web-telecast Peer to peer-all areas (state-state) Strategic plan, mission, goals and philosophy-culture Mock town-hall meetings Presentation skills | Mentoring development e-learning University Transportation Centers Blended-multi depending on subject matter On-the-job training Internships Job Rotation Social club interaction Lunch and learn Outside exchanges with other agencies Tuition assistance Professional organizations Public/private partnerships Professional certification tied to pay increase |
|---|--|

Table 9. Current Training Delivery Methods

Understanding how training is provided today allows for a contrast to what the future may hold and the gap between the two. Table 9 contains a synthesis of the key points of information gathered on current training delivery methods. The contents of Table 9 are not surprising inasmuch as they reflect the basic means for offering training to state DOT employees over many years. True, some are newer than others (such as e-learning and the use of web-telecasts), but most are rather traditional in their use and are common among the majority of the states.

In turning to the future and the optimal model for training delivery, the HR directors offered their insights into how “in-service” training could best be provided to state DOT employees. In their discussions it was clear that many of the current practices would still be required, such as a certain amount of classroom training, the use of e-learning tools, and others. However, in looking at the inputs found in Table 10 it is clear that an unconstrained model has many attributes and dimensions not typically found in state DOT training programs today.

| | |
|---|---|
| <ul style="list-style-type: none"> More e-learning w/ picture/video Cross-training Overlap/shadow Work outside of government Job trading Just-in-time training Program money to support training TRAC/scholarship Community perspective Youth intervention Military partnerships Resource sharing Best practices Assessment tools Curricular National transportation university Coaching Mentoring Temp professional agency Knowledge matters | <ul style="list-style-type: none"> Openly discuss mistakes – 3M model More opportunity for training Link between training and organizational mission Empowerment/accountability Hire talent we need at market competitive rates Have senior leadership “walk the walk” Agency culture Networking skills According to job title Formal employee development Program w/ training plan Project management academy Certified public management Program 1 year University cooperation Instructors provided to schools for technical areas Training Assistance Program (TAP) Pooled-fund institutes Typing training to career development, i.e., educate employees on what they need to do to advance, not just time-based |
|---|---|

Table 10. Unconstrained Training Delivery Methods and Attributes

In many ways, the contents of Table 10 can be seen as a broader and less traditional view or approach to training. For example, it is a significant departure from the typical mass-delivery method used in most agencies to recognize the need for “just-in-time” training, or training that is tailored specifically to the individual and to the specific point in his professional development where he or she finds himself at a particular moment. Also, the above list indicates more openness to seeking training and professional development from other organizations as well as a desire to broaden the skills that are gained in the training process. Gone are the traditional approaches often offered by the state HR agency to

the DOT wherein a “one size fits all” approach to training is intended to accommodate the needs of the transportation agency as well as a myriad of other agencies within a given state.

There are many common themes emerging from the HR directors’ input relating to the core and complementary skills they envision for employees within the broad range of classifications listed here. One significant theme is the increasing importance being placed on “soft” skills and how these abilities have migrated to the core area of a position’s requirements. For example, even ten years ago one would not have placed facilitation or communications in the core area of many of the technical engineering positions within state DOTs. Today, most of those responding to this discussion by the HR directors saw such attributes either as present needs or certainly those that will be emphasized in the near future.

Clearly, future training delivery must be different than it is today. While some of the more traditional methods may still be employed to some degree, they will be supplanted by a more nimble and flexible delivery approach that gives employees more specific training at the right time and place to achieve a maximal level of effectiveness. It will draw on a wider array of resources—many of which would be seen as non-traditional today but which will be logical and obvious to trainers in the future. Ultimately, an agency’s ability to efficiently deliver the best type of training to its employees when they most need that professional development will determine the value derived from this critical investment in their workforce.

CHAPTER FOUR

SURVEY OF STATE TRAINING MANAGERS

BACKGROUND

The second research effort employed to gather information on “in-service” training needs involved state DOT training directors. This was accomplished through a survey conducted of the AASHTO member states, with 26 managers participating in this telephone inquiry. The intent of this effort was to capture a more detailed response to the issue of “in-service” training as seen through the eyes of the training professionals within the state DOTs. All told, it was an interesting and valuable process resulting in many shared insights that add perspective to this topic. This chapter contains an aggregation of the responses to this survey. Summaries from the respective responding states can be found in Appendix B.

RESULTS

The product of these discussions is an array of insights into the state of “in-service” training among the AASHTO member departments. They will be divided into logical subject areas and summarized in the remainder of this chapter.

Generalized Core and Complementary Skills

In conducting the survey these training directors were asked about the training needs of the employees within their DOT. Many quickly confirmed the assumption that each professional and technician had the basic *technical* skills required of their particular position when they were hired and that these skills were further improved on the job or through formalized training. This being the case, these training professionals then turned their discussion towards the *non-technical* skills required for such positions. Assuming that each employee possesses this basic technical skill set, the following were the non-technical core and complementary skills that the training managers judged to be important for virtually all classifications of employees within their agency.

General Core Skills

- Communication skills (both verbal and written)
- Understanding and using technology
- Computer skills
- Cross training for greater diversity
- Leadership (no consensus on core or complementary)
- Partnering skills

- Ethics
- Succession planning

General Complementary Skills

- Customer service
- Public relations
- Interpersonal relations
- Process Improvement
- Leadership (no consensus on core or complementary)
- Negotiation
- Team-building
- Managing change and stress
- Political awareness
- Time management

COMMON THEMES

Promotion Impacts Training is often seen as having a singular impact but in fact it is multi-dimensional in nature. For example, as an individual rises in the organizational hierarchy and takes on greater and greater responsibility, there is an additive effect in his skill requirements (both in the core and complementary areas). Thus, as an employee goes from a line position to a supervisor, he must now have new leadership, management, supervisory, and financial skills. As he is promoted to even more responsible positions, he is then expected to have a greater vision of his work unit's role in the overall purpose and direction of the agency, including budget or fiscal responsibilities. This same trend continues in the complementary areas such as public relations skills. At the line level an employee may not have to deal with the media or the public directly. Later, as he receives an increase in responsibilities, he often must develop more and more sophisticated public-involvement or relations skills.

Turnover For many years, the time-in-service characteristics of a state DOT could be graphically reflected in the shape of a "bell curve," with a few new employees, a few ready to retire, and the majority somewhere in between. As the workforce has aged, this "bell curve" has now become inverted, with large numbers of both new employees and those nearing retirement. This radical change has resulted in a unique pressure brought to bear on state DOT leaders and their

training professionals as they endeavor to prepare new employees for greater responsibilities at a pace faster than ever before experienced. The ability to rely on “on-the-job” training to prepare employees over long periods of time for promotional opportunities is no longer an option. Compounding this issue are the increasing demand placed on individual performance to meet higher and higher customer expectations and the apparent difficulty of breaking individuals away from their job responsibilities to participate in training.

Multi-Generational Issues Many agencies are faced with a broad cross-section of employees reflecting a different demographic than ever before experienced. These employees must interact and function well together in providing the products and services offered by their agencies. Whether they represent the “Baby Boomer” generation or the “Gen X or Y” segments of our society, each worker must function effectively with the others. Developing training programs that successfully address the needs of such a cross-section of the workforce is a continuing challenge for professional trainers. Sometimes a “Baby Boomer” will retire from a DOT agency and return to work there as an employee of an engineering consulting company. In this case, he may then report to, or work for, a current state employee who has many years less experience than he. Both the retiree and the current employee need to be able to deal with their respective roles in a way that is complementary to one another.

Training Management Most of the training directors interviewed expressed concern that they did not have complete authority or oversight for the training programs in their respective agencies. In some cases the interviewer was required to talk to multiple individuals in the same agency to ascertain the overall or complete picture of the state of “in-service” training for their employees. In some DOTs the training director would handle only general courses such as sexual-harassment training or other broad topics of interest to all employees, while the more specific or technical subject matter was dealt with by specific divisions within the agency. For example, the maintenance or operations division may be responsible for training their employees in specific practices or skills unique to their unit.

While virtually all had some kind of centralized training function, in all the interviews conducted it was found that only the Arizona Department of Transportation had a truly centralized function that focused on managing, developing, and deploying, the full spectrum of “in-service” training offered within their agency. Some of the more common decentralization was so complete that the agency training director had very little involvement in much of the training within the DOT. Training professionals expressed grave concerns that this lack of centralized management resulted in no administrator having a complete picture of the training needs or of the gap that exists between what is required and that which is currently being offered.

The DOT Training Ground As agencies further reduce staffing levels and outsource more and more of their traditional work activities, there has been a resulting migration of state employees to the private sector. This trend in departures is often influenced by the possibility of greater compensation opportunities in the private sector. In addition, the downsizing of agencies such as the Florida DOT (that reduced its workforce by 25% in the late 1990s) has created an environment of uncertainty that leads state employees to wonder if they are able to spend their whole career at a state DOT, or not.

Ultimately, these factors result in a higher tendency for state employees to move to the private sector and then perform many of their same duties as consultants to the very agency they left. In some ways this is a positive outcome inasmuch as these former employees know the state system and are able to perform well for their new client/former employer. However, it does put the state DOT in the position of having to constantly “recharge” its cadre of trained professionals and technicians for in-house work.

Making the Case for Training One of the challenges lamented by many training directors was the lack of a true cost benefits analysis of training and its contribution to the overall mission of the state DOT. Unlike the private sector, where clear analysis of financial benefits is performed and then results measured after training is conducted, state DOTs have largely been unable to make the case for additional training dollars in this manner. While the basis for increased budgets are intuitive, the ability of a state DOT to impact its budgetary process is often stymied by other “more pressing” issues which may be driven by projects, politics, circumstances in other state agencies, etc. The need for training directors, senior DOT management, and those who confer with legislative bodies to better make the case for the value that training brings to the mission of the agency was offered by many of these training professionals. A sound financial model that would assist state DOTs in making this case would be of benefit to virtually all agencies.

Utilizing the Community College Platform Many states identified the community colleges as an important partner in delivering training, education, and certification for the transportation community. Once the basic curriculum is established, DOTs, cities, counties, engineering consultants, and contractors can then have access to well-executed training experiences.

In addition, while there will continue to be a need for specialized training for each organization, many of the basic courses are the same (e. g., survey, mathematics, basic design, equipment operation, etc.) for the entire transportation community. Another benefit derived from the community college model is that the public will have access to the courses, as well. Therefore, individuals who apply for positions in industry will have the opportunity to prepare ahead of

time for those opportunities. In some cases individuals from the transportation community actually deliver the training for the community college, thus bringing added value to the training of the students based upon the “real life” experience of the instructors. This arrangement provides the most knowledgeable teachers and allows DOT employees to leverage their skills to enhance their income-earning abilities.

The most successful programs are those wherein there exists a healthy partnership between the state DOT and the transportation community as a whole. In this case, employees from many different organizations are trained side by side, thereby engendering a healthy professional respect for a counterpart’s ability to perform the same tasks to an expected standard. Funding such programs is generally an issue, leading some directors to suggest that a national initiative be launched that would both encourage this type of training scenario as well as provide seed funding to move it forward. Joint training and certification programs emanating from this environment would raise the bar for meeting the “in-service” training requirements of a state DOT.

All of those surveyed had some existing relationship for training delivery in their state with some formal educational institution, be it a community college, technical college, or university. Agreements varied from tuition reimbursement to a model in the Georgia DOT where they have developed a Transportation Curriculum on the Technical University Platform that is accessible by the DOT, cities, and counties. Often, if a person completes the course work provided, he has a good chance of securing a position with one of the governmental agencies. A few of the states are finding that individuals are coming into their agency without basic mathematics and English skills as a foundation on which to even begin the required transportation training. With the Georgia model, not only do they have these basic skills, but also have shown a specific interest in working in the transportation industry versus just getting a DOT job by default.

Retirements and Their Impact on Training In varying degrees the coupled impacts of an aging workforce and accelerated retirements are of concern to every one of the training directors interviewed. In all cases a large percentage of the overall DOT staff is eligible or will be eligible to retire within the next five years, with estimates ranging as high as 50%. Although the specific circumstances varied from state to state and were largely anecdotal in nature, there was a general trend towards organizations that are younger and less experienced as these retirements occur. The problem is compounded by the directors’ collective sensing that many of the newer employees are not looking at the state DOT as long-term employment. Thus, the training that is offered to the ten-year-or-less seniority employee may at any time walk out the door, requiring that the training process must begin again. No one suggested this attrition to be a sufficient

reason to stop training new employees, but rather commented to this point as a reflection of the continuous nature of the training effort.

Delivering Training Answers varied from state to state regarding the optimal method for delivering training to state DOT employees. Virtually all mentioned the use of classroom training, training deployed using technology, the need for timely or “just in time” training, e-learning, self-paced training and other common methods. However, no one focused totally on a single approach; rather, the sense of this research is that the optimal approach would be one that “blended” many methods depending on the type of skills to be obtained as well as the audience. Clearly, there was no one that seemed to think that face-to-face training would be totally replaced by technology solutions. In some cases, it was noted that e-learning might be one step in a process that also included formalized, classroom-style training to achieve the final results. The overall need to be effective and efficient in training delivery was certainly a common theme throughout the state responses.

Variations in Training Emphasis Areas There was not always agreement among the states on certain skills being classified as core versus complementary. For example, if a state was currently emphasizing communications it was viewed as a core skill. On the other hand, if it was currently a low area of emphasis it was considered a complementary skill. Leadership was a skill that was considered by some to be core and by others complementary, and a few included it as both. Some reflection was offered by these training professionals concerning the variations in training emphasis areas based on changes in their DOT leadership. Under one secretary or director, a certain type of course may be emphasized, while under another a totally different grouping might be stressed. All recognized this as a part of the political process that determines the leadership of their agencies, but lamented the fact that it resulted in some waste of resources.

Leadership Support of Training While no quantitative data were gathered to measure the level of leadership support given to training, it is clear there is a wide variation across the country. Top management of state DOTs understand the value of training and its role in meeting their mission requirements as an agency. What varies from state to state appears to be the willingness or ability to turn that commitment into actual training courses and classrooms filled with students. The training directors appreciate the political dynamics facing a state DOT CEO, but are frustrated that there are not means for overcoming those dynamics and advancing an effective and sustained training program that will prepare their agencies for the future.

There were many other common issues raised by the training professionals that deserve attention in this report.

Additional themes are listed below in random order, but the reader should understand that their inclusion reflects more than a single response on the topic:

- There is not enough time to both coordinate training and do the training
- Retirements result in loss of years of skill and knowledge (brain drain)
- There is a need to bring new engineers up to speed quickly
- Limited resources and staff to accomplish training
- Many managers use a blended approach to delivering training (e. g., in-house versus outsourcing)
- Community colleges and universities help deliver training
- Project-manager training needs improvement
- The need for face-to-face training (technology is only a tool)
- The need for a good data base to track training
- The need for a good succession plan
- The need to know the direction the DOT is moving to establish skills and develop training
- There is interest in capturing what other managers are doing in the training arena
- The need for stability and support from leadership to promote effective training
- Employees and managers in technical areas don't always see the value in soft training
- Very few training positions oversee all training in the DOT
- DOTs have evolved into training organizations for industry/private sector recruits from the DOTs after individuals are trained
- Cultural and generational differences need to be understood
- The new generation lacks loyalty; they don't see the DOT as long-term employment

The survey of state DOT training directors yielded many insightful and helpful data points in determining the course of “in-service” training for agency employees. While their answers often varied, there were strong emerging themes that are worth noting. One would be the nature of the core and complementary skills listed earlier in this chapter. While there is still a need for technology-related skills, virtually all of the others mentioned would be considered “soft” skills and are a reflection of the changing nature of states’ DOT work and the expectations placed on their employees. The advent of Context Sensitive Design (CSD), sometimes referred to as Context Sensitive Solutions (CSS), has caused state

DOTs to realize that many of their field professional and technical staff need to acquire facilitation- and consensus-building skills in addition to the ability to construct roads and bridges to engineering specifications. Also noteworthy was the lack of differentiation between professional and technical personnel in terms of what training directors thought they needed in the way of “in-service” training. This revealed commonality will surely aid in both course development and delivery.

Demographic issues--including employee turnover, promotions, retirements, and generational issues--are certainly at the forefront of thought among these training professionals. Recognizing these characteristics of the twenty-first century workforce is one of the keys to developing sound training programs that meet the ever-changing needs in a state DOT. A trend towards partnerships with other organizations and private-sector companies, as well as academic institutions, appears to be a dimension that will need to be leveraged even more in the future.

Leadership and funding are of concern, and both will certainly impact the future of “in-service” training for state DOTs. These are challenging times, with fiscal constraints impacting every decision and program at a state DOT. The ability of a state DOT chief executive officer (CEO) to clearly articulate the added value and benefits derived from a robust training program will sometimes carry the budgetary day. On other occasions, the political drive to deliver projects will overcome even the best-prepared rationale for more effective training.

Perhaps most surprising in this survey is the diverse nature of how training is organized in state DOTs and how dispersed it is in terms of management, delivery, and direction of course content. Although these organizations and training applications have developed over long periods of time, it seems appropriate that each agency now takes a hard look at both its structure and the curriculum that will become its “in-service” training program for the future.

CHAPTER FIVE

STATE CEOs' VIEW OF IN-SERVICE TRAINING

The final input sought in defining “in-service” training needs of state employees was that of current CEOs of the individual state DOTs. This was accomplished through a series of facilitated sessions and discussions held at respective regional meetings convened during the summer of 2005. Recognizing that all of these leaders are responsible in a specific manner for both the performance of their agency and the delivery of transportation services in their state, their view of training and its contribution to achievement of DOT objectives was seen as being of key value.

The state CEOs come from a variety of walks of life and backgrounds. Some are career state employees with many long years of DOT experience driving their views on the subject of “in-service” training. On the other hand, others are relatively new to the state DOT world, having been appointed to their current positions after holding positions of significant responsibility in the private sector. All told, the aggregate contribution of the CEOs proved valuable in assessing the professional training needs of state employees across the country.

In discussing these training needs within their agencies, CEOs were asked to consider both professional and technical classes. In addition, their input was sought on how training could best be delivered to achieve objectives for equipping their employees with the skills to meet their transportation mission. A collection of the CEOs' thoughts is offered in Appendix D. In some cases, multiple similar responses were combined, but only if there would be no concept or thought lost in so doing. While not every comment will be addressed, the remainder of this chapter is dedicated to the major themes that emerged from the CEOs' comments.

IN-SERVICE TRAINING NEEDS FOR PROFESSIONALS

The state CEO's were asked to first identify the “in-service” training needs of their professional employees. No distinction was made between engineers and non-engineers in the solicitation of their thoughts on topic. While many of their remarks can be construed as being focused on their engineering employees, many other comments will be seen as applicable to all professionals.

Project/Program Management There were numerous comments about the need to train state DOT employees in the area of project management. This is precipitated by the changes occurring in the state workload, which is more and more focused on delivering both larger projects and multiple smaller projects. The CEOs went on to describe skills such as financial management, right-of-way procurement and administration, design, knowledge of issues relating to the

National Environmental Policy Act (NEPA), and others. In addition, their desired skill set for program managers also included the ability to administer and manage the work efforts of outside engineering consulting services. In a notable area where project management crosses from engineering to non-engineering professionals, there is also a recognized need for this skill set for managing information technology (IT) project development for software systems, as well as for planning and financial projects. All told, the need to provide greater depth in training in the area of project management was one of the most common mentioned by the CEOs.

Public/Stakeholder Relations There is a sense among the CEOs that their professional employees need additional training to prepare them for dealing with the media in both print and broadcast formats. This requirement is driven by the more intense scrutiny and exposure the media gives to transportation programs and projects across the country. The public's desire to know, and the media's interest in accommodating that interest result in a need at all levels to have employee training for those dealing with the media.

Closely related is the CEOs' interest in training their employees in the areas of stakeholder involvement and relations. With the advent of such efforts as Context Sensitive Design (CSD) or Context Sensitive Solutions (CSS) and other more aggressive public- outreach initiatives, the need for engineers and non-engineers alike to have the ability to facilitate meetings, achieve consensus among diverse public interests, and address community concerns has never been greater. In most cases, state DOT employees do not come to their current positions with formal training to accomplish these tasks, and it, therefore, necessarily falls to the individual to either learn these skills on the job or from a personal mentor. Ideally, the DOT should provide the training to meet this need. Clearly, providing this skill set to professionals is seen as a necessary component of "in-service" training for the future.

Leadership Developing leadership skills in professional employees received frequent mention during the sessions with the state CEOs. Their vision of leadership development is not reserved for the top or most senior employees; rather, it extends to leaders at all levels of their organizations. Some states already are engaged in providing leadership training. For example, South Carolina has programs that are focused on both senior and junior management.

There is a clear recognition among CEOs that state employees must develop and apply leadership skills at a more robust level than heretofore required in order to meet the significant demands being placed on state DOTs. There was also a theme that emerged from these discussions that leadership training should begin early in order to prepare individuals for significant positions in senior management in the future.

Ethics The topic of ethics was mentioned with some emphasis by the CEOs, enough so that it deserves mention in this chapter along with the other highlighted topics. Whether their concern is driven by recent scandals that have plagued other industries and companies in the United States or not, their desire for ethics training is clear. Alternatively, considering the increasing size of the state programs and the substantial funds being managed by state employees, there is a compelling need for employees in all categories to act ethically in all professional responsibilities.

Global Issues This report would not be complete without a focus on some of the global issues mentioned by the CEOs in their discussions on the subject of “in-service” training. These issues included freight logistics, the global economy, intermodal issues, political considerations, demographic trends, and technology implementation. In summary, the CEOs stressed that future leaders will need to not only possess the technical engineering skill sets necessary to do their DOT jobs, but will also need to have the ability to think and act more globally.

TECHNICAL IN-SERVICE TRAINING NEEDS

While most of the discussion with the CEOs was focused on their professional employees, they also offered key insights into the “in-service” training needs of their technical workers. Clearly, they recognize the pivotal role played by this latter group in delivering DOT services, and the compelling reasons behind equipping them with the skills needed to meet today’s mission requirements.

Common among many states is the recognition that many of their technicians currently are performing tasks that might have been performed by engineers in the past. The reasons for this vary, but the outcomes are the same. It is a trend that is playing out in many other professions such as in the medical field where physician assistants (PAs) fill some of the duties of licensed physicians. Nurse practitioners, teachers’ aides, and many dental assistants all perform some of the duties and functions reserved for professionals only ten or twenty years ago. Recognizing this trend, the CEOs identified the need to develop their technical personnel in ways that both complement their functioning in these roles and contribute to overall mission delivery. To date, technicians working at this higher level gained the additional skills they needed through their own initiative and not through a formalized means of “in-service” training. Today, however, the demand for offering the kind of training technicians would need to function proficiently at the “para-professional” level requires a more deliberate and methodical approach.

TRAINING DELIVERY

A portion of time in each of the discussions with the CEOs was spent on how training was delivered and what could be

done to more effectively offer specific training to their employees. There were many thoughts commonly expressed that will be summarized here.

One significant recognition on the part of the CEOs was the need to make the delivery of training more efficient. They stressed the importance of conserving resources, whether it was the actual time spent in training or the funds expended. With limited stores of both, CEOs are feeling pressure to maximize the training offered (and its outcomes) while investing only those monies that are necessary to achieve these outcomes. Many mentioned leveraging already-existing course offerings by the American Association of State Highway and Transportation Officials (AASHTO), the American Council of Engineering Companies (ACEC), or the American Society of Civil Engineers (ASCE). In particular, each was familiar with the one-week AASHTO management course offered on multiple occasions throughout the year as well as a three-week course offered at the University of Indiana. Some suggested that these courses could be updated, expanded to offer on-site training in specific states, and otherwise changed to meet the “in-service” training needs of their DOTs.

Existing relationships with community colleges, University Transportation Centers (UTC), and other technical-training providers was noted by a number of the CEOs. They proposed that these institutions could be used to a greater degree to more effectively provide for the training needs of the state DOTs. There also was expressed interest in finding ways to optimize such relationships to the benefit of state DOTs.

There are many other skills identified by the state CEOs as being necessary for their professional employees. Some skills will be relatively easy to provide; others will be more difficult. The challenge of providing the latter was most pointedly noted by one CEO who said, “How do we train our employees to be creative?” “How do you train someone to be innovative, creative, independent in his thought process, and so forth?” All of these attributes and skills will be required as professionals serve in the years to come. The challenge inherent in providing high-quality “in-service” training is to cover all these topics and more so that the full spectrum of skills is applied by state DOT professionals, regardless of the positions they hold.

In the discussions with the CEOs, it also was evident that training needed to be more precise in its delivery and content. They indicated that the day of mass training that was intended for large numbers of employees, without regard to the immediacy of their need or the specific roles they fill in a DOT, was over. There was intensity to the discussions that should be encouraging to all. Nevertheless, there was also a heightened expectation of effectiveness by those

involved in the training efforts in their agencies. They obviously know that “in-service” or professional training activities can and must be improved to prepare employees to meet the missions of their agency.

CHAPTER SIX

CONCLUSIONS

The challenges currently facing state departments of transportation are formidable, and their number increases daily. State DOTs continue to work hard to deliver on the services incident to a mobility demand for both people and freight that is at an all-time high. Among these challenges is the ever-shrinking pool of available resources.

. These diminishing resources include limited time, driven by the fact that customers want and expect projects and services faster than ever before. Another scarce resource is available capital. Even with highway funding at record levels from both state and federal sources, the gap between available funds and existing needs in the fifty states continues to grow. Closing that gap becomes more difficult each year with competing priorities pressing elected officials for many of the same revenues that might be available for transportation purposes. A third scarce resource is agency human resources. The workforce that makes all this happen on a daily basis continues to decline in both their availability and their ability to perform the demanding work of state DOTs. Equipping this workforce with requisite skills has become a major concern and is the impetus behind this research effort. Addressing the topic, “In-Service Training Needs for State DOTs” is crucial to the success of state DOTs in the years ahead.

The states are not alone in facing this challenging situation. The private sector also is experiencing similar transitions in terms of the work environment, workforce demographics, and organizational and cultural evolutions that are rapidly occurring. Perhaps what differentiates the private sector from the state DOT model is its ability to respond more quickly in changing times and its ability to recognize the cost-benefit analysis that drives training decisions in their world. Nevertheless, whether public- or private-sector in origin, organizations must address “in-service” or professional development training needs in an aggressive and effective manner to remain competitive within their respective spheres of activity.

The information gathered in the process of completing this research is valuable at all levels of a state DOT organization. Regardless of whether a leader is the director of the state DOT’s human resources unit, or the manager of the training activity, or the CEO, his or her comprehension of both the “in-service” training needs of employees and the most effective manner in training delivery is of paramount importance to the future of the agency. From this research, there emanate clear patterns and themes that should guide leaders in charting the course for training their professionals and technicians to be more qualified and skilled in performance of their professional duties.

The following conclusions may be drawn from this research.

Train Technicians and Recognize Them as Para-Professionals For many years, highly skilled technicians have performed critical duties within the state DOTs. Under the direction of registered professionals, these technicians have accomplished key design-and-construction-related tasks that have been most valuable in enabling state DOTs to meet their project-delivery requirements. It is clear from the comments of human resources directors that they expect these technicians to exhibit mastery of many of the technical skills expected of the professionals. Many of the “soft” skills necessary for professional classifications also are on the core-skill list for technicians. In addition, other more technical skills are also found on the technicians’ core list, adding further credence to the case that technician training should be viewed as a major “in-service” training need for state DOTs in the future.

Program/Project Management as a Core Skill There was a strong message from all three groups indicating a need to improve in the project/program management segment of “in-service” training for state DOTs. With so many large projects and large programs of projects on the docket, it is clear that this need will only grow as the years progress. Public accountability and expectations dictate that DOTs ensure their project managers are well-trained and prepared to manage a diverse range of issues including outsourced resources, right-of-way, design, construction, planning, financing, public involvement, and public relations. Greater emphasis on this particular skill set is seen as an important training tool for employees in many different classifications in the state agencies.

Migration of Skills From Complementary to Core Within all three groups interviewed, there is a definite reflection of the changing nature of the work performed by state DOT employees. Not only are they required to possess significant technical skills in their respective disciplines, but also are expected to have many other “soft” skills available in their arsenal of abilities. Ten years ago it would have been rare for a research project like this to identify facilitation skills, consensus building, and stakeholder involvement as core skills for individuals in the engineering fields. Yet, in aggregating the information gathered for the project from the three input groups, there is a clear indication of this movement in almost all areas. Understandably, today’s field engineer is expected to perform a myriad of technical duties such as materials testing, structural engineering, and hydraulics; however, he now must also be skilled in these other “soft” areas of the business. It is a notable and definite trend that must be addressed in the “in-service” or professional development training of the future for technicians and professionals alike.

Training Management Perhaps the most surprising finding of this research is the highly decentralized nature of training management within the state DOTs. Evidence is strong that there is no single person responsible for all training facets of the agency. Perhaps no individual can be fully capable of personally managing the program, designing the

curriculum, and addressing the technical and other skill areas for an agency, but there is an obvious need for centralized coordination, management and leadership. Given the importance of training activities within the state DOTs, however, it is evident that only appropriate staffing and structuring will facilitate delivery of results that support the agency's mission and purpose.

Traditional Training Delivery Must Give Way to More Effective Approaches This research revealed that much of the training delivery within state DOTs is still based on the traditional classroom approach and a variety of other standard methodologies. However, future training delivery will require new techniques, including the following:

- Just-in-time (JIT) training (provided when the employee needs it)
- Tailored training, individually crafted to meet the specific skill needs of a specific employee
- Training provided through a mixture of methodologies including e-learning, web-based solutions, self-paced instruction, and others
- Training provided through partnerships with other organizations/institutions (see below)

Partnerships With Other Organizations/Institutions Training needs of state DOTs will be partially met through more strategic partnerships with other organizations, including:

- Other state DOTs
- Federal Highway Administration (FHWA)
- American Association of State Highway and Transportation Officials (AASHTO)
- Other professional organizations
- Community Colleges
- University Transportation Centers
- Joint industry training programs

Such partnerships could include curriculum development, instructors from throughout industry, joint-certification programs, tuition reimbursement, education/work collaboration programs, and others. Ultimately, these partnerships have the potential to leverage the scarce resources of many organizations towards a common benefit for all.

Making The Case For Training The ability to make a compelling case for a substantial increase in funding for training is hampered by state DOTs' inability to provide cost-benefit analysis that elected officials will accept as justification. State DOTs must determine a methodology that will allow them to communicate effectively to this end so that they can secure necessary funding to further invest in training efforts within their agency.

Leadership Another common theme emerging from the three groups is the need to develop leaders at all levels of the state DOT. While the skill set varies from one management level to the next, there are specific abilities that all leaders need to be effective in filling this critical role in a transportation agency. Training for current and future leaders must feature a curriculum that includes development of skills in the areas of mentoring, communications, strategic planning, process improvement, facilitation, consensus building, training, and other important operations. The experiences shared in this research project strongly establish the fact that leadership training is an on-going process, not a singular educational event in a person's professional career. Of particular note from the CEO inputs is their feeling that interacting with others through the AASHTO management programs is of significant value in the process of developing leaders in state DOTs.

Global Issues In addition to the more traditional technical skills and the emerging "soft" skills that state DOT employees are being required to obtain, there is a growing need for these individuals to become knowledgeable about larger issues that transcend the world of the state DOT. For example, where does an engineer learn about public finance, public/private partnerships, the global economy, advances in technology, supply-chain economics, research and development, and other areas? Such topics may not normally be thought to fall within the normal suite of needed skills; nevertheless, they reflect the kind of depth an emerging leader should have. The case can be made that DOT leaders cannot function effectively without this diversity of knowledge and experience; yet it is safe to say that these topics are rarely a part of the traditional program of "in-service" training provided to professionals or technicians in a state DOT.

The "Softest of the Soft" Perhaps one of the most challenging areas of "in-service" or professional-development training is the need to create leaders who are skilled at innovation and the creative-thought process. These are skills that can be taught to some degree, but not in a traditional format or training environment. The current demands placed upon state DOTs does not allow them the luxury of having leaders who are not innovative in finding solutions that may be beyond past norms. They must learn from the past, but create solutions to problems in the present.

The opportunities for state DOTs to improve their approach to "in-service" training are many. That is not to say that the current approach has not been or is not good. Rather, this research is intended to be a forward-looking approach to "in-service" or professional development training needs in state DOTs and, as such, the conclusions and the consequential actions arising from this report should be seen as enhancements or a maturing of what is already in place. To continue down the existing path will yield disappointing outcomes and will not address the new world confronting

state DOTs. Changes in approach, based on the conclusions listed in this chapter, will bring about the improvements necessary for states to meet their mission requirements.

REFERNCES

American Association of State Highway and Transportation Officials, *Transportation Invest In America, The Bottom Line*, 2002

FHWA Highway Statistics, US Department of Transportation, Washington, D.C., 2001.

Hudson Institute, "Workforce 2020," Hudson Institute, Inc., 1997.

Judy, Richard W., Carol D'Amico, *Workforce 2020: Work and Workers in the 21st Century*, Hudson Institute, Indianapolis, Indiana, 1997.

Malone, Thomas W., "The Future of Work," Harvard Business School Press, 2004.

Poister, TH, LG Nigro, R. Bush, *Innovative Strategies for Upgrading Personnel in State Transportation Departments*, NCHRP Synthesis of Highway Practice 163, National Research Council, Washington, D.C., 1990.

Texas Transportation Institute (TTI), *2005 Mobility Report*, 2005.

Transportation Research Board, *A Look Ahead-Year 2020*, Special Report 220, 1988.

Transportation Research Board, *Transportation Professionals: Future Needs and Opportunities*, Special Report 207, 1985.

Warne, Thomas R., "Developing Transportation Agency Leaders," *National Cooperative Highway Research Program*, 2005

Warne, Thomas R., "State DOT Outsourcing and Private-Sector Utilization," *National Cooperative Highway Research Program*, Synthesis 313, 2003.

Weatherby, Cynthia A., "Managing Change in State Departments of Transportation: Scan 5 of 8: Innovations in Workforce Strategies," *National Cooperative Highway Research Program*, May 2001.

BIBLIOGRAPHY

“14th Annual Survey Results,” Thomas Staffing, Available: <http://www.thomas-staffing.com/survey99/retention.htm>, [2002, June 10].

American Association of State Highway and Transportation Officials, *Transportation Invest In America, The Bottom Line*, 2002

American Association of State Highway and Transportation Officials, *The AASHTO Guide to Recruitment and Retention of Civil Engineers*, 1990.

Ahlich, Nancy S. *Managers of Choice: 5 Competencies for Cultivating Top Talent*, Davies-Black, Palo Alto, California, 2003.

Ashby, Franklin C., Arthur R. Pell, *Embracing Excellence*, Prentice Hall Press, Paramus, NJ 2001.

Bernthal, Paul R., Richard S. Wellins, “Retaining Talent: A Benchmarking Study,” *HR Benchmark Group: Developmental Dimensions International*, Volume 6, Number 3, February 2001.

Buchan, James, “Global Nursing Shortages,” *British Medical Journal*, Volume 324, Issue 7340, March 30, 2002, pg.751-752.

Charan, Ram, Stephen Drotter, James Noel, *The Leadership Pipeline: How to Build the Leadership Powered Company*, Jossey-Bass, San Francisco, 2001.

Collins, Jim *Good to Great*, HarperCollins Publishers Inc., New York, NY 2001.

Conger, Jay A., Robert M. Fulmer, “Developing Your Leadership Pipeline,” *Harvard Business Review*, Harvard Business School Publishing, Harvard, 2003.

Covey, Stephen R. *Principle-Centered Leadership*, Simon and Shuster, New York, NY 1991.

Daniels, Imogen, “How’s Your Retention?” *People Management*, Volume 8, Issue 2, January 24, 2002, p. 53.

Davis, Mary J., *Corporate Culture as the Driver of Transit Leadership Practices*, Transit Cooperative Research Program, Washington, D.C., 2003

Delahoussaye, Martin, “Leadership in the 21st Century,” *Training*, August 2001.

DeMers, Allen, “Solutions and Strategies for IT Recruitment and Retention: A Manager’s Guide,” *Public Personnel Management*, Volume 31, Issue 1, Spring 2002, pp. 27-40.

DePree, Max *Leadership is an Art*, Bantam Doubleday Dell Publishing Group Inc., New York, NY 1989. 11

- “Employee Retention Survey,” Kansas Department of Administration, Available:
<http://da.state.ks.us/ps/subject/retention.htm>, [2002, June 10].
- .Estell, Libby, “Military Intelligence,” *Incentive*, Volume 55, Issue 8, August 2001, pp. 63-67.
- Glagola, CR, C Nichols, “Recruitment and Retention of Civil Engineers in Departments of Transportation,” *Leadership and Management in Engineering*, Volume 1, Issue 1, 2001, pp. 30-36.
- Hoel, Lester A., Michael A. Perfater, “Succession Planning at the State DOT Level,” *Transportation Research Record*, July 1995, pp. 51-56.
- Hood, Jacqueline N., Tony Alarid, David Albright, “Staffing Plan Survey of State Transportation Agencies,” *Transportation Research Record*, 2000, pp. 12-20.
- Hudson Institute, “Workforce 2020,” Hudson Institute, Inc., 1997
- Iacocca, Lee, William Novak, *Iacocca: An Autobiography*, Bantam, June 1986.
- “Identification of the Critical Workforce Development Issues in the Transit Industry,” *Research Results Digest*, Transit Cooperative Research Program, Washington, D.C., December 2001.
- Jardine, Edith, Stacy Amig, “Managing Human Capital,” *Behavioral Health Management*, Volume 21, Issue 2, Mar/Apr 2001, p22-26.
- Judy, Richard W., Carol D’Amico, *Workforce 2020: Work and Workers in the 21st Century*, Hudson Institute, Indianapolis, Indiana, 1997.
- Langan, Shelley, “Finding the Needle in the Haystack: The Challenge of Recruiting and Retaining Sharp Employees,” *Public Personnel Management*, Volume 29, Issue 4, Winter 2000, pp. 461-464.
- Malone, Thomas W., “The Future of Work,” Harvard Business School Press, 2004
- Marcus, Bernie and Blank, Arthur, *Built From Scratch*, Random House, New York, NY, 1999.
- Michaels, Ed, Helen Handfield-Jones, Beth Axelrod, *The War for Talent*, Harvard Business School Press, Boston, 2002.
- Mure, D., “How to: Recruit and Retain the Next Generation of Managers and Supervisors,” *Constructor*, Volume 83, Issue 12, December 2001, pp. 31-32.
- “Occupational Employment Projections to 2010,” *Monthly Labor Review*, November 2001, pg. 57-84.
- Poister, TH, LG Nigro, R. Bush, *Innovative Strategies for Upgrading Personnel in State Transportation Departments*, NCHRP Synthesis of Highway Practice 163, National Research Council, Washington, D.C., 1990.

Shiplot, Myra H., "Training Programs, Processes, and Practices", *National Cooperative Highway Research Program*, August 2005

Slater, Robert, *Jack Welch & The G.E. Way: Management Insights and Leadership Secrets of the Legendary CEO*, McGraw-Hill, July 1998.

Society for Human Resource Management, *Retention Practices Survey*, SHRM Foundation, Alexandria, VA, 2000.

Sorcher, Melvin, James Brant, "Are You Picking the Right Leaders?" *Harvard Business Review*, Harvard Business School Publishing, Harvard, 2002.

Thibodeau, Patrick, "In Survey: Above All Else, IT Workers Need Challenge," *Computerworld*, Volume 35, Issue 3, January 2001, p20.

Transportation Research Board, *A Look Ahead-Year 2020*, Special Report 220, 1988

Transportation Research Board, *Managing Transits' Workforce in the New Millennium*, TCRP Report 77, National Research Council, Washington, D.C., 2002.

Transportation Research Board, *Transportation Professionals: Future Needs and Opportunities*, Special Report 207, 1985

Warne, Thomas R., "Developing Transportation Agency Leaders," *National Cooperative Highway Research Program*, 2005

Warne, Thomas R., "State DOT Outsourcing and Private-Sector Utilization," *National Cooperative Highway Research Program*, Synthesis 313, 2003

Weatherby, Cynthia A., "Managing Change in State Departments of Transportation: Scan 5 of 8: Innovations in Workforce Strategies," *National Cooperative Highway Research Program*, May 2001.

**APPENDIX A
State Survey Standard Form**

STATE:

**Contact Name:
Current Position:**

**E-Mail:
Phone Number:**

INTRO – On Behalf of TOM WARNE & ASSOCIATES I would like to ask a few questions regarding future training needs of your agency. We are looking for information that may not be obvious ie we know an RE has to have knowledge of material testing skills. We are looking for non-traditional core and complimentary skills needed today and in the future DOT environment as well as how best to deliver the needed training.

1) Follow is a list of three core skills needed in a DOT today and in the future. Are there similar needs in your DOT? What additional core skills are needed? Are there any Core Skills specific to Field Engineering, PM/Development, Operations and Maintenance or Administration?

| | |
|---------------------------------|----------------|
| Computer Skills | FE |
| Communication Skills | PM |
| Understanding Technology | O&M |
| | Admin |

2) Now the same question only Complementary Skills: Do you agree with the following three? Are there others needed? Are there any Complementary Skills specific to Field Engineering, PM/Development, Operations and Maintenance or Administration?

| | |
|-------------------------------|----------------|
| Customer Service | FE |
| Interpersonal skills | PM |
| Public Relation Skills | O&M |
| | Admin |

3) What training gaps exist? For example far more outsourcing is taking place around the country. What training is needed to provide the DOT personnel with financial and productivity skills to analyze a Consultants proposal?

4) Now think outside the box. If there are no financial or operational restrictions in an ideal world how would you deliver training?

5) What will be needed in the next five years to insure DOT personnel have the required skills to meet the demands of a rapidly changing, fast paced organization?

Other Comments:

Note Trends:

**APPENDIX B
State Survey Responses**

STATE: Arizona

**Contact Name: Judy Barrette
Current Position: Director**

**E-Mail: jbarrette@azdot.gov
Phone Number: 602 712-6680**

1) Following is a list of three core skills needed in a DOT today and in the future. Are there similar needs in your DOT? What additional core skills are needed? Are there any Core Skills specific to Field Engineering, PM/Development, Operations and Maintenance or Administration?

| | |
|---------------------------------|----------------|
| Computer Skills | FE |
| Communication Skills | PM |
| Understanding Technology | O&M |
| | Admin |

Agreed with the above added: Generational differences and Process Improvement

2) Now the same question only Complementary Skills: Do you agree with the following three? Are there others needed? Are there any Complementary Skills specific to Field Engineering, PM/Development, Operations and Maintenance or Administration?

| | |
|-------------------------------|----------------|
| Customer Service | FE |
| Interpersonal skills | PM |
| Public Relation Skills | O&M |
| | Admin |

Agreed with the above added: Facilitation

3) What training gaps exist?

A gap exists in project management. They need more knowledge of the project management process.

4) Now think outside the box. If there are no financial or operational restrictions in an ideal world how would you deliver training?

Utilize blending training part computer part classroom. They are working with a Community College to develop a training curriculum.

5) What will be needed in the next five years to insure DOT personnel have the required skills to meet the demands of a rapidly changing, fast paced organization?

A knowledge management system is needed in order to transfer knowledge from the long term employee that is close to retirement to the new employee coming in the door. Utilize return retirees for training as they are the subject matter experts.

Other Comments:

Half of ADOT's employees will be eligible to retire in three years.

STATE: Arkansas

Contact Name: Ken Jordon
Current Position:

E-Mail: Ken.Jordon@arkansashighways.com
Phone Number: 501 569-2694

1) Following is a list of three core skills needed in a DOT today and in the future. Are there similar needs in your DOT? What additional core skills are needed? Are there any Core Skills specific to Field Engineering, PM/Development, Operations and Maintenance or Administration?

Computer Skills
Communication Skills
Understanding Technology

FE
PM
O&M
Admin

Agreed with the above.

2) Now the same question only Complementary Skills: Do you agree with the following three? Are there others needed? Are there any Complementary Skills specific to Field Engineering, PM/Development, Operations and Maintenance or Administration?

Customer Service
Interpersonal skills
Public Relation Skills

FE
PM
O&M
Admin

Agreed with the above added: Leadership.

3) What training gaps exist?

Maintenance needs more technical training from entry level through supervisory positions including asphalt and concrete.

4) Now think outside the box. If there are no financial or operational restrictions in an ideal world how would you deliver training?

Looking at outsourcing both internally and using the Community College/Universities. This is in the development stage.

5) What will be needed in the next five years to insure DOT personnel have the required skills to meet the demands of a rapidly changing, fast paced organization?

Need Public Relations skills when dealing with the public sector. For example, Maintenance needs to be proactive in promoting alternate routes when working on the roads. They will also continue to need OJT.

Other Comments:

They have similar issues with upcoming retirements, although they still have quite a few employees remaining in the 10-15 year range.

STATE: California

Contact Name: June Fong
Current Position: Training Manager

E-Mail: june.fong@dot.ca.gov
Phone Number: 916 227-6814

*1) Following is a list of three core skills needed in a DOT today and in the future. Are there similar needs in your DOT? What additional core skills are needed? Are there any Core Skills specific to Field Engineering, PM/Development, Operations and Maintenance or Administration?

| | |
|---------------------------------|----------------|
| Computer Skills | FE |
| Communication Skills | PM |
| Understanding Technology | O&M |
| | Admin |

Agreed with above and added: Capital project skills, strategic planning, team building

*2) Now the same question only Complementary Skills: Do you agree with the following three? Are there others needed? Are there any Complementary Skills specific to Field Engineering, PM/Development, Operations and Maintenance or Administration?

| | |
|-------------------------------|----------------|
| Customer Service | FE |
| Interpersonal skills | PM |
| Public Relation Skills | O&M |
| | Admin |

Agreed with above and added: Mission, vision, project management, civil rights, partnering, succession planning.

3) What training gaps exist?

Gaps exists in customer service, partnering and there is a push to improve written communications.

4) Now think outside the box. If there are no financial or operational restrictions in an ideal world how would you deliver training?

It depends on the subject matter. We should use a combination of classroom, on-line training, E-learning, and self study (can also vary with how remote an area it is). They are using Community Colleges, Universities and outside vendors to deliver training.

5) What will be needed in the next five years to insure DOT personnel have the required skills to meet the demands of a rapidly changing, fast paced organization?

In the future, mentorship and cross-training will need to be utilized.

*Interpreted from a more detailed questionnaire

STATE: Connecticut

Contact Name: Cheryl Wallace
Current Position: Acting Director

E-Mail: cheyrl.malerba@po.state.ct.us
Phone Number: 860 594-3600

1) Following is a list of three core skills needed in a DOT today and in the future. Are there similar needs in your DOT? What additional core skills are needed? Are there any Core Skills specific to Field Engineering, PM/Development, Operations and Maintenance or Administration?

Computer Skills
Communication Skills
Understanding Technology

FE
PM
O&M
Admin

Agreed with the above.

2) Now the same question only Complementary Skills: Do you agree with the following three? Are there others needed? Are there any Complementary Skills specific to Field Engineering, PM/Development, Operations and Maintenance or Administration?

Customer Service
Interpersonal skills
Public Relation Skills

FE
PM
O&M
Admin

Agreed with the above added: Leadership Skills

3) What training gaps exist?

Resources and Staffing are more an issue than gaps.

4) Now think outside the box. If there are no financial or operational restrictions in an ideal world how would you deliver training?

Use Traditional modes for delivering training. With technology it depends on what you are teaching. They use both Community Colleges and Universities for training.

5) What will be needed in the next five years to insure DOT personnel have the required skills to meet the demands of a rapidly changing, fast paced organization?

Resources and succession planning.

Other Comments:

They have similar issues with employees retiring, but not sure to what extent.

STATE: Florida

Contact Name: Bill Bryan
Current Position: Training Manager

E-Mail: bill.bryan@dot.state.fl.us
Phone Number: 850 414-5336

1) Following is a list of three core skills needed in a DOT today and in the future. Are there similar needs in your DOT? What additional core skills are needed? Are there any Core Skills specific to Field Engineering, PM/Development, Operations + Maintenance or Administration?

| | |
|---------------------------------|----------------|
| Computer Skills | FE |
| Communication Skills | PM |
| Understanding Technology | O&M |
| | Admin |

Agreed with the above added: It depends on the level of the position. They need good verbal and writing skill as well as being able to get up and speak in front of groups.

2) Now the same question only Complementary Skills: Do you agree with the following three? Are there others needed? Are there any Complementary Skills specific to Field Engineering, PM/Development, Operations and Maintenance or Administration?

| | |
|-------------------------------|----------------|
| Customer Service | FE |
| Interpersonal skills | PM |
| Public Relation Skills | O&M |
| | Admin |

Agreed with the above added: As a part of interpersonal skills, they need leadership management skills and the ability to work with politicians.

3) What training gaps exist?

They currently provide approximately 1100 courses. They have a supervisor and leadership academy but need something in between.

4) Now think outside the box. If there are no financial or operational restrictions in an ideal world how would you deliver training?

They need to match learning styles to what they do in the classroom. Need evaluation so they can tell how they are doing. The University of Florida is contracted to manage their construction certification process. The Community Colleges provide soft skills training. They are developing software to train Consultants.

5) What will be needed in the next five years to insure DOT personnel have the required skills to meet the demands of a rapidly changing, fast paced organization?

They need to be more in tune with people issues. There needs to be coordination with Consultants and Contractors. Succession planning is needed, but it is difficult in government agencies. They need to train people to be better mentors.

Other Comments: They are decentralized but all training comes through the Training Manager. They had a problem with basic math skill so they worked with University of Florida to get there folks the required skills.

STATE: Georgia

Contact Name: Jim Davis
Current Position:

E-Mail: jim.davis@dot.state.ga.us
Phone Number: 404 651-7451

1) Following is a list of three core skills needed in a DOT today and in the future. Are there similar needs in your DOT? What additional core skills are needed? Are there any Core Skills specific to Field Engineering, PM/Development, Operations + Maintenance or Administration?

| | |
|---------------------------------|----------------|
| Computer Skills | FE |
| Communication Skills | PM |
| Understanding Technology | O&M |
| | Admin |

Agreed with the above added: PM, the ability to assign tasks, monitor performance, and identify issues.

2) Now the same question only Complementary Skills: Do you agree with the following three? Are there others needed? Are there any Complementary Skills specific to Field Engineering, PM/Development, Operations and Maintenance or Administration?

| | |
|-------------------------------|----------------|
| Customer Service | FE |
| Interpersonal skills | PM |
| Public Relation Skills | O&M |
| | Admin |

Agreed with the above added: Selecting leaders

3) What training gaps exist?

Computer based training is more of a problem but less of a gap because new employees are very familiar with computer operations. The most comprehensive gap is in project management, accountability, recognizing need to improve and becoming outcome oriented.

4) Now think outside the box. If there are no financial or operational restrictions in an ideal world how would you deliver training?

Video conferencing can't do it all; you still need face to face instruction. They are working on DVD's and a self study OJT text. They've created a program with the local Technical College that trains future technical field personnel for Cities, Counties and DOT. It's a one year program and all the governmental agencies involved work together to insure the successful candidate a job.

5) What will be needed in the next five years to insure DOT personnel have the required skills to meet the demands of a rapidly changing, fast paced organization?

First you need to recognize it will take more resources. In the past a new employee had ten years working with an employee with 20 years experience to learn his job. This model no longer exists and we need an intensive training program with incentives to complete it. They provide a 10% increase upon completion of the program. They have increased their training budget by 300% in the last seven years. The motto is, "tie what you learn to what you earn."

Other Comments: Need to make more use of self training texts and DVD's.

STATE: Hawaii

Contact Name: Eleanor Bramble
Current Position:

E-Mail: Eleanor.bramble@hawaii.gov
Phone Number: 808 587-2149

1) Following is a list of three core skills needed in a DOT today and in the future. Are there similar needs in your DOT? What additional core skills are needed? Are there any Core Skills specific to Field Engineering, PM/Development, Operations and Maintenance or Administration?

| | |
|---------------------------------|----------------|
| Computer Skills | FE |
| Communication Skills | PM |
| Understanding Technology | O&M |
| | Admin |

Agreed with the above added: Safety - work zone MUTCD and OSHA; Bridges; LTAP; Technical skills and Leadership/management.

2) Now the same question only Complementary Skills: Do you agree with the following three? Are there others needed? Are there any Complementary Skills specific to Field Engineering, PM/Development, Operations and Maintenance or Administration?

| | |
|-------------------------------|----------------|
| Customer Service | FE |
| Interpersonal skills | PM |
| Public Relation Skills | O&M |
| | Admin |

Agreed with the above added: Civil rights and Stress management

3) What training gaps exist?

They are decentralized not all training goes through her so she can't answer for the agency. HR provides soft skills training and she does safety.

4) Now think outside the box. If there are no financial or operational restrictions in an ideal world how would you deliver training?

Use a combination classroom, practical and OJT depending on the subject and the people being trained. The Community College does drug testing.

5) What will be needed in the next five years to insure DOT personnel have the required skills to meet the demands of a rapidly changing, fast paced organization?

People will need to learn and be updated by the computer and attend conferences. They will need stable leadership and consistent direction.

Other Comments: Many people are eligible for retirement. Hawaii has a strong employee union.

STATE: Idaho

Contact Name: Marcia Aitken
Current Position: Training Manager

E-Mail:maitken@itd.state.id.us
Phone Number: 208 334-8042

1) Following is a list of three core skills needed in a DOT today and in the future. Are there similar needs in your DOT? What additional core skills are needed? Are there any Core Skills specific to Field Engineering, PM/Development, Operations + Maintenance or Administration?

| | |
|---------------------------------|----------------|
| Computer Skills | FE |
| Communication Skills | PM |
| Understanding Technology | O&M |
| | Admin |

Agreed with the above added: Leadership - ability to self access and lead change; Communication - collaborate and dialog; Problem solve in a fact based manner.

The same skills vary as you move up the organization; they are on a graduated scale, (i.e.) Leadership skills are needed throughout your career but they change as you promote.

2) Now the same question only Complementary Skills: Do you agree with the following three? Are there others needed? Are there any Complementary Skills specific to Field Engineering, PM/Development, Operations and Maintenance or Administration?

| | |
|-------------------------------|----------------|
| Customer Service | FE |
| Interpersonal skills | PM |
| Public Relation Skills | O&M |
| | Admin |

Agree with the above

3) What training gaps exist?

There are gaps in PM (i.e.) in evaluating consultant proposals, problem solving & mentoring.

4) Now think outside the box. If there are no financial or operational restrictions in an ideal world how would you deliver training?

Partnering is a part of their community. Partner with those that have a specific expertise using both classroom and online training. Distinguish between theory and reality and help them come to the right conclusions. They do work through the Community Colleges.

5) What will be needed in the next five years to insure DOT personnel have the required skills to meet the demands of a rapidly changing, fast paced organization?

There should be a more comprehensive approach to training within the DOT's. AASHTO should take a leadership in DOT training nationally. CEO's need to take a look at HR issues including training so the process is less fragmented.

Other Comments: There needs to be a training manager that oversees all of training for the organization. Technical organizations are not as receptive to soft training. They are also facing a large number of retirements with new hires needing to be brought up to speed very quickly. Due to low salaries and lack of raises turnover accentuates this problem.

STATE: Iowa

Contact Name: Chris Anderson
Current Position: Tech Training Coordinator

E-Mail: christie.anderson@dot.state.ia.us
Phone Number: 515 239-1819

1) Following is a list of three core skills needed in a DOT today and in the future. Are there similar needs in your DOT? What additional core skills are needed? Are there any Core Skills specific to Field Engineering, PM/Development, Operations and Maintenance or Administration?

| | |
|---------------------------------|----------------|
| Computer Skills | FE |
| Communication Skills | PM |
| Understanding Technology | O&M |
| | Admin |

Agreed with the above added: Lead worker and supervisor training; Team skills

2) Now the same question only Complementary Skills: Do you agree with the following three? Are there others needed? Are there any Complementary Skills specific to Field Engineering, PM/Development, Operations and Maintenance or Administration?

| | |
|-------------------------------|----------------|
| Customer Service | FE |
| Interpersonal skills | PM |
| Public Relation Skills | O&M |
| | Admin |

Agreed with the above added: Leadership

3) What training gaps exist?

They are in the process of developing lead worker training.

4) Now think outside the box. If there are no financial or operational restrictions in an ideal world how would you deliver training?

It totally depends on the type of training (i.e.) Lab is face to face; Safety is Computer based. Technology is a training tool. They are working with the Community Colleges on Tech Training.

5) What will be needed in the next five years to insure DOT personnel have the required skills to meet the demands of a rapidly changing, fast paced organization?

In the past DOT's relied on senior employees helping new employees learn their job. That model no longer exists so we need a good training program that trains them before they start doing their job.

Other Comments:

There is a skills matrix completed by the Trans Curriculum Coordination Council (TCCC) that can be viewed at their web sight www.nhi.fhwa.dot.gov/tccc then go to publications.

STATE: Kansas

Contact Name: Scott Swanson
Current Position: Training Manager

E-Mail: swanson@ksdot.org
Phone Number: 785 296-0429

1) Following is a list of three core skills needed in a DOT today and in the future. Are there similar needs in your DOT? What additional core skills are needed? Are there any Core Skills specific to Field Engineering, PM/Development, Operations and Maintenance or Administration?

Computer Skills
Communication Skills
Understanding Technology

FE: Partnering
PM: Partnering
O&M
Admin

Agreed with the above added: Communication to include conflict resolution, negotiation skills and emotional intelligence

2) Now the same question only Complementary Skills: Do you agree with the following three? Are there others needed? Are there any Complementary Skills specific to Field Engineering, PM/Development, Operations and Maintenance or Administration?

Customer Service
Interpersonal skills
Public Relation Skills

FE: Consensus Building
PM
O&M: Consensus Building
Admin

Agreed with the above.

3) What training gaps exist?

The ability to determine the benefit cost via Financial Analysis

4) Now think outside the box. If there are no financial or operational restrictions in an ideal world how would you deliver training?

As part of all job descriptions within management include training the trainer. Every job requires training the person working for them in technical and soft skills. This isn't the training manager but every leader within the organization.

5) What will be needed in the next five years to insure DOT personnel have the required skills to meet the demands of a rapidly changing, fast paced organization?

Have a leadership forum at HQ. Discuss different generations and strategies for gen-xers working with baby boomers. Make sure they are listening to each other. Work with the young engineers coming into the DOT.

STATE: Kentucky

Contact Name: Carol Jarvis
Current Position: Director

E-Mail: carol.jarvis@ky.gov
Phone Number: 502 564-2720

1) Following is a list of three core skills needed in a DOT today and in the future. Are there similar needs in your DOT? What additional core skills are needed? Are there any Core Skills specific to Field Engineering, PM/Development, Operations and Maintenance or Administration?

| | |
|---------------------------------|----------------|
| Computer Skills | FE |
| Communication Skills | PM |
| Understanding Technology | O&M |
| | Admin |

Agreed with above added: Time Management; Goal Planning; and Basic Math Skills (Needed due to turnover in Technicians)

2) Now the same question only Complementary Skills: Do you agree with the following three? Are there others needed? Are there any Complementary Skills specific to Field Engineering, PM/Development, Operations and Maintenance or Administration?

| | |
|-------------------------------|----------------|
| Customer Service | FE |
| Interpersonal skills | PM |
| Public Relation Skills | O&M |
| | Admin |

Agree with above added: Public Involvement

3) What training gaps exist?

Project Management Training

4) Now think outside the box. If there are no financial or operational restrictions in an ideal world how would you deliver training?

Combination of Classroom with web based video conferencing. L-Tap has a Trans Center at the University of Kentucky. DOT pays to attend their classes.

5) What will be needed in the next five years to insure DOT personnel have the required skills to meet the demands of a rapidly changing, fast paced organization?

Retirement issues are a major concern. There are a large number of boomers leaving in 2008 and not enough personnel in the middle of the organization to replace them. Not sure what the answer is.

STATE: Maine

Contact Name: Allen Moss
Current Position: Training Administrator

E-Mail: allen.moss@maine.gov
Phone Number: 207 624-3055

1) Following is a list of three core skills needed in a DOT today and in the future. Are there similar needs in your DOT? What additional core skills are needed? Are there any Core Skills specific to Field Engineering, PM/Development, Operations and Maintenance or Administration?

| | |
|---------------------------------|----------------|
| Computer Skills | FE |
| Communication Skills | PM |
| Understanding Technology | O&M |
| | Admin |

Agreed with the above added: Time management organization

2) Now the same question only Complementary Skills: Do you agree with the following three? Are there others needed? Are there any Complementary Skills specific to Field Engineering, PM/Development, Operations and Maintenance or Administration?

| | |
|-------------------------------|----------------|
| Customer Service | FE |
| Interpersonal skills | PM |
| Public Relation Skills | O&M |
| | Admin |

Agreed with the above.

3) What training gaps exist?

Doesn't have oversight of entire DOT training.

4) Now think outside the box. If there are no financial or operational restrictions in an ideal world how would you deliver training?

Use technology, (i.e.) video conferencing for regions. Use traditional face to face methods supplemented with E-learning. They have tuition reimbursement for college and university classes as well as use them for their certification program.

5) What will be needed in the next five years to insure DOT personnel have the required skills to meet the demands of a rapidly changing, fast paced organization?

There needs to be an increased awareness of cultural and generational issues.

Other Comments: They have a lot of people ready for retirement. Looking for ways to hire qualified personnel that have experience, certifications, etc. They hire a number of seasonal personnel.

STATE: Maryland

Contact Name: Karen Russo
Current Position: Equal Opportunity Officer

E-Mail: krusso@sha.state.md.us
Phone Number: 410 810-3227

1) Following is a list of three core skills needed in a DOT today and in the future. Are there similar needs in your DOT? What additional core skills are needed? Are there any Core Skills specific to Field Engineering, PM/Development, Operations and Maintenance or Administration?

| | |
|---------------------------------|----------------|
| Computer Skills | FE |
| Communication Skills | PM |
| Understanding Technology | O&M |
| | Admin |

Agreed with the above added: Math skills

2) Now the same question only Complementary Skills: Do you agree with the following three? Are there others needed? Are there any Complementary Skills specific to Field Engineering, PM/Development, Operations and Maintenance or Administration?

| | |
|-------------------------------|----------------|
| Customer Service | FE |
| Interpersonal skills | PM |
| Public Relation Skills | O&M |
| | Admin |

Agreed with the above added: Leadership; Management

3) What training gaps exist?

Doesn't have oversight of Training for entire DOT.

4) Now think outside the box. If there are no financial or operational restrictions in an ideal world how would you deliver training?

They would deliver training by utilizing a blended approach using all formats due to logistics. This includes E-training, workbooks, and stand up training. They work with the Community College on math, leadership and mechanic training.

5) What will be needed in the next five years to insure DOT personnel have the required skills to meet the demands of a rapidly changing, fast paced organization?

Put new employees through more than orientation training; show them how to do their job. Utilize a mentoring program.

Other Comments: There have a similar training problem as most States. In her District 58% of the workforce could retire at any time and 87% of the manager are eligible to retire.

STATE: Michigan

Contact Name: Coleen Hines
Current Position: Administrator

E-Mail: hinesc@michigan.gov
Phone Number: 517 335-2464

1) Following is a list of three core skills needed in a DOT today and in the future. Are there similar needs in your DOT? What additional core skills are needed? Are there any Core Skills specific to Field Engineering, PM/Development, Operations and Maintenance or Administration?

| | |
|---------------------------------|----------------|
| Computer Skills | FE |
| Communication Skills | PM |
| Understanding Technology | O&M |
| | Admin |

Agreed with above added: System perspective for work they are doing. Supply chain management plays into PM.

2) Now the same question only Complementary Skills: Do you agree with the following three? Are there others needed? Are there any Complementary Skills specific to Field Engineering, PM/Development, Operations and Maintenance or Administration?

| | |
|-------------------------------|----------------|
| Customer Service | FE |
| Interpersonal skills | PM |
| Public Relation Skills | O&M |
| | Admin |

Agreed with above added: Political awareness; Understanding transportation financial management; and Leadership skills.

3) What training gaps exist?

There is a huge gap due to finances and staffing. Due to an early-out a lot of corporate knowledge walked out the door. In general there is a training gap in finance, advanced technology and research.

4) Now think outside the box. If there are no financial or operational restrictions in an ideal world how would you deliver training?

Research the marketplace and find the best technical and soft training available. Set up the DOT to provide training throughout the organization and extend it to their customers and suppliers.

5) What will be needed in the next five years to insure DOT personnel have the required skills to meet the demands of a rapidly changing, fast paced organization?

Have Leadership and Management commitment provide staff and resources to provide the training to develop the skills. (Last year training office was cut by half.)

Other Comments: The staffing model facing other DOT's applies to them as well. Due to hiring restrictions in the past there aren't enough people to fill in for those leaving. Need succession planning.

STATE: Minnesota

Contact Name: Cathryne Walz
Current Position: Director

E-Mail: cathy.walz@dot.state.mn.us
Phone Number: 651 296-3101

1) Following is a list of three core skills needed in a DOT today and in the future. Are there similar needs in your DOT? What additional core skills are needed? Are there any Core Skills specific to Field Engineering, PM/Development, Operations and Maintenance or Administration?

Computer Skills
Communication Skills
Understanding Technology

FE: Inspector Academy
PM: PM Academy
O&M
Admin

Agreed with the above added: Leadership Skills; Back to basics math and reading; Knowledge Transfer; and Managing Design Build.

2) Now the same question only Complementary Skills: Do you agree with the following three? Are there others needed? Are there any Complementary Skills specific to Field Engineering, PM/Development, Operations and Maintenance or Administration?

Customer Service
Interpersonal skills
Public Relation Skills

FE
PM
O&M
Admin

Agreed with above added: Partnering; Collaboration; Diversity; and Generational Differences.

3) What training gaps exist?

Leadership is a big issue. Have a training gap regarding diversity. Need to get back to basics (i.e.) teach basic math & English skills. Safety needs more coordination. Various people in DOT offer training and there is no coordination, (i.e.) the Districts provide their own training.

4) Now think outside the box. If there are no financial or operational restrictions in an ideal world how would you deliver training?

Training delivery would be blended, some classroom and some E-learning. There also needs to be face to face training. There is a need for Instructional Design - A class that would take 8 hours could be reduced to 2 hours with good instructional design. They do utilize the Community College System for some training but the DOT has to pay for the classes.

5) What will be needed in the next five years to insure DOT personnel have the required skills to meet the demands of a rapidly changing, fast paced organization?

To provide the proper training the DOT needs to establish the direction it is going in the future (i.e.) context sensitive design, design build, etc.

Other Comments: Many are retiring. They are having difficulty replacing Construction Inspectors. There needs to be a succession plan and there needs to be one person that oversees all training for the organization.

STATE: Mississippi

Contact Name: Terry Winsted
Current Position:

E-Mail:twinsted@mdot.state.ms.us
Phone Number: 601 359-9788

1) Following is a list of three core skills needed in a DOT today and in the future. Are there similar needs in your DOT? What additional core skills are needed? Are there any Core Skills specific to Field Engineering, PM/Development, Operations and Maintenance or Administration?

Computer Skills
Communication Skills
Understanding Technology

FE
PM
O&M
Admin

Agreed with the above added: Leadership and management; Succession planning.

2) Now the same question only Complementary Skills: Do you agree with the following three? Are there others needed? Are there any Complementary Skills specific to Field Engineering, PM/Development, Operations and Maintenance or Administration?

Customer Service
Interpersonal skills
Public Relation Skills

FE
PM
O&M
Admin

Agreed with the above

3) What training gaps exist?

Doesn't have oversight for all training in DOT.

4) Now think outside the box. If there are no financial or operational restrictions in an ideal world how would you deliver training?

Would use a combination off conventional classroom and distance learning. Logistics can be a challenge for conventional classroom training.

5) What will be needed in the next five years to insure DOT personnel have the required skills to meet the demands of a rapidly changing, fast paced organization?

Everyone needs to recognize the changes taking place due to all the retirements. There is a need to develop a plan. They have an accelerated management program.

Other Comments: She is not involved in technical training.

STATE: Missouri

Contact Name: Jim Pasley
Current Position: Board Member

E-Mail: James.Pasley@modot.mo.gov
Phone Number: 573 526-1228

1) Following is a list of three core skills needed in a DOT today and in the future. Are there similar needs in your DOT? What additional core skills are needed? Are there any Core Skills specific to Field Engineering, PM/Development, Operations and Maintenance or Administration?

| | |
|---------------------------------|----------------|
| Computer Skills | FE |
| Communication Skills | PM |
| Understanding Technology | O&M |
| | Admin |

Agreed with the above added: Primary Communication; PM or Project Admin - putting together teams.

2) Now the same question only Complementary Skills: Do you agree with the following three? Are there others needed? Are there any Complementary Skills specific to Field Engineering, PM/Development, Operations and Maintenance or Administration?

| | |
|-------------------------------|----------------|
| Customer Service | FE |
| Interpersonal skills | PM |
| Public Relation Skills | O&M |
| | Admin |

Agreed with the above

3) What training gaps exist?

They don't have a database to track training. There are more needs than training can fulfill.

4) Now think outside the box. If there are no financial or operational restrictions in an ideal world how would you deliver training?

Utilize video conferencing and on-line courses. Ideally have a formal Technical Training Academy that employees can complete prior to their first day of work. SW Missouri State provides management training.

5) What will be needed in the next five years to insure DOT personnel have the required skills to meet the demands of a rapidly changing, fast paced organization?

Need people to come to the work place with the necessary skills. Run them through a technical boot camp. There needs to be a dual track developed that allows a technical engineer to earn as much if not more than a manager.

Other Comments: Brain drain is a big issue. 60% of the work force is eligible to leave within the next five years. The problem was caused by a large hiring effort 35 years ago.

STATE: Montana

Contact Name: Susan Anderson
Current Position:

E-Mail: sanderson@state.mt.us
Phone Number: 406 444-6262

1) Following is a list of three core skills needed in a DOT today and in the future. Are there similar needs in your DOT? What additional core skills are needed? Are there any Core Skills specific to Field Engineering, PM/Development, Operations and Maintenance or Administration?

Computer Skills
Communication Skills
Understanding Technology

FE
PM
O&M
Admin

Agreed with the above added: Leadership; Ethics; and Safety.

2) Now the same question only Complementary Skills: Do you agree with the following three? Are there others needed? Are there any Complementary Skills specific to Field Engineering, PM/Development, Operations and Maintenance or Administration?

Customer Service
Interpersonal skills
Public Relation Skills

FE
PM
O&M
Admin

Agreed with the above added: Delegation skills

3) What training gaps exist?

There is a gap in problem solving training. There is also a problem reaching everyone with a limited staff.

4) Now think outside the box. If there are no financial or operational restrictions in an ideal world how would you deliver training?

Technology is great, but training needs to be hands on with a person in the room to help with group exercises. Group exercises are also beneficial in providing an environment for networking and developing relationships. They have an agreement with the local Community College to use their facilities and staff as subject matter experts.

5) What will be needed in the next five years to insure DOT personnel have the required skills to meet the demands of a rapidly changing, fast paced organization?

There is a need for succession planning with the large number of employees eligible for retirement.

Other Comments: She handles management training; others take care of technical training.

STATE: Nevada

Contact Name: Mark Evans
Current Position: Training Manager

E-Mail: mevans@dot.state.nv.us
Phone Number: 775 888-7808

1) Following is a list of three core skills needed in a DOT today and in the future. Are there similar needs in your DOT? What additional core skills are needed? Are there any Core Skills specific to Field Engineering, PM/Development, Operations + Maintenance or Administration?

| | |
|---------------------------------|----------------|
| Computer Skills | FE |
| Communication Skills | PM |
| Understanding Technology | O&M |
| | Admin |

Agreed with above added: Conflict Resolution Skills; Leadership Skills; and Project Management.

2) Now the same question only Complementary Skills: Do you agree with the following three? Are there others needed? Are there any Complementary Skills specific to Field Engineering, PM/Development, Operations and Maintenance or Administration?

| | |
|-------------------------------|----------------|
| Customer Service | FE |
| Interpersonal skills | PM |
| Public Relation Skills | O&M |
| | Admin |

Agreed with the above added: Process Improvement

3) What training gaps exist?

A gap they have experienced is having a consultant develop a system and not training DOT staff on how to use it or using it to its full potential. Most gaps are technology related.

4) Now think outside the box. If there are no financial or operational restrictions in an ideal world how would you deliver training?

Training should be instructor led all the way using technology for support (a training tool). They have contracts with the Community College for continuing education including leadership, computer and PM.

5) What will be needed in the next five years to insure DOT personnel have the required skills to meet the demands of a rapidly changing, fast paced organization?

They have started looking at succession planning. All divisions answer the questions, "Why is your division a good place to work? Where are you going to get people to staff your division over the next 5-10 years? and What will you need for technology and management skills?"

Other Comments: They have a number of employees retiring. They are continuing their Rotational Engineer Program for Engineers out of school. The retention of Engineers going through this program is good. More emphasis has been placed on training in the time he has worked for the agency.

STATE: New Jersey

Contact Name: William Bennett
Current Position: Manager

E-Mail: william.bennett@dot.state.nj.us
Phone Number: 609 530-2954

1) Following is a list of three core skills needed in a DOT today and in the future. Are there similar needs in your DOT? What additional core skills are needed? Are there any Core Skills specific to Field Engineering, PM/Development, Operations and Maintenance or Administration?

Computer Skills
Communication Skills
Understanding Technology

FE
PM
O&M
Admin

Agreed with the above added: Project Management

2) Now the same question only Complementary Skills: Do you agree with the following three? Are there others needed? Are there any Complementary Skills specific to Field Engineering, PM/Development, Operations and Maintenance or Administration?

Customer Service
Interpersonal skills
Public Relation Skills

FE
PM
O&M
Admin

Agreed with the above added: Teamwork and Innovation skills.

3) What training gaps exist?

Gaps exist in innovation, Project Management (have been working on for 18 months), and skills for handling public forum in their smart growth initiative.

4) Now think outside the box. If there are no financial or operational restrictions in an ideal world how would you deliver training?

Need a good system teaching core training. One that recommends training for each title and tracks the training received. They use the Community College for Electrical and Mechanical training.

5) What will be needed in the next five years to insure DOT personnel have the required skills to meet the demands of a rapidly changing, fast paced organization?

They need a diversity program with emphasis on civil rights. There needs to be more focus on process improvement, less reliance on individual skills and more on process.

Other Comments: They have staffing issues similar to other DOT's with folks leaving due to retirement and new hires needing accelerated training.

STATE: Pennsylvania

Contact Name: Gavin Gray
Current Position: Senior Civil Engineer

E-Mail:gagray@state.pa.us
Phone Number: 717 783-5542

*1) Following is a list of three core skills needed in a DOT today and in the future. Are there similar needs in your DOT? What additional core skills are needed? Are there any Core Skills specific to Field Engineering, PM/Development, Operations and Maintenance or Administration?

Computer Skills
Communication Skills
Understanding Technology

FE: Materials testing, structural
PM: CAD, scheduling, design
O&M: Pavement design
Admin: Data entry, Enviro, RW

*2) Now the same question only Complementary Skills: Do you agree with the following three? Are there others needed? Are there any Complementary Skills specific to Field Engineering, PM/Development, Operations and Maintenance or Administration?

Customer Service
Interpersonal skills
Public Relation Skills

FE
PM
O&M
Admin: Payroll, purchasing

Agreed with the above added: Negotiation, Technical writing, cross-training, writing skills, understanding DOT process.

3) What training gaps exist?

Gaps exist in functional area work groups. Need to identify skill sets and training needs. The challenge is to get time to train while they are doing their job. This demand was caused by a large number of retirements in the last three years.

4) Now think outside the box. If there are no financial or operational restrictions in an ideal world how would you deliver training?

He is in the design training group where they utilize courses on CD ROM, consultant taught classroom training, and video conferencing.

5) What will be needed in the next five years to insure DOT personnel have the required skills to meet the demands of a rapidly changing, fast paced organization?

The challenge is getting the time to get people trained while they are doing their job. There is a need to get senior engineers to transfer their knowledge before they retire.

Other Comments: He is developing an entry level engineering course.

*Interpreted from a more detailed questionnaire.

Territory: Puerto Rico

Contact Name: Eric Mendoza
Current Position:

E-Mail: emendoza@act.dtop.gov.pr
Phone Number: 787 721-8787

*1) Following is a list of three core skills needed in a DOT today and in the future. Are there similar needs in your DOT? What additional core skills are needed? Are there any Core Skills specific to Field Engineering, PM/Development, Operations and Maintenance or Administration?

Computer Skills
Communication Skills
Understanding Technology

FE: Inspection, Contract Admin, Structural Eng
PM: Contract Admin, Environmental, RW
O&M: Handled by another Department
Admin: Plan reading, Project admin.

Agreed with above added: Utilities

*2) Now the same question only Complementary Skills: Do you agree with the following three? Are there others needed? Are there any Complementary Skills specific to Field Engineering, PM/Development, Operations and Maintenance or Administration?

Customer Service
Interpersonal skills
Public Relation Skills

FE
PM
O&M
Admin

Agreed with above added: Leadership

3) What training gaps exist?

A gap exists in transferring technical knowledge to Engineers due to large number of retirements. Due to demands of job there is little time to train.

4) Now think outside the box. If there are no financial or operational restrictions in an ideal world how would you deliver training?

Continue to use in house classroom training. They utilize NHI training.

5) What will be needed in the next five years to insure DOT personnel have the required skills to meet the demands of a rapidly changing, fast paced organization?

There will need to be a shift from Construction-Admin Skills to Administrative Skills. Most of the roads have been built now they need to be administered.

*Interpreted from a more detailed questionnaire.

STATE: South Carolina

Contact Name: Martha Monjo
Current Position: Training Director

E-Mail: monjoms@dot.state.sc.us
Number: 803 737-1371

*1) Following is a list of three core skills needed in a DOT today and in the future. Are there similar needs in your DOT? What additional core skills are needed? Are there any Core Skills specific to Field Engineering, PM/Development, Operations and Maintenance or Administration?

| | |
|---------------------------------|-------------------------------------|
| Computer Skills | FE |
| Communication Skills | PM |
| Understanding Technology | O&M: Equipment Operation |
| | Admin |

Agreed with the above, added: Partnering; safety; multi-tasking; team building; vision; performance measures; planning; budgeting, its; political process; and asset management.

*2) Now the same question only Complementary Skills: Do you agree with the following three? Are there others needed? Are there any Complementary Skills specific to Field Engineering, PM/Development, Operations and Maintenance or Administration?

| | |
|-------------------------------|---|
| Customer Service | FE |
| Interpersonal skills | PM |
| Public Relation Skills | O&M: law, construction Admin |
| | Admin: Maintaining Currency |

Agreed with the above added: Negotiation; facilitation; cross-training, DOT processes.

3) What training gaps exist?

Cross training particularly in maintenance and construction. They need an understanding of each other's job to better perform theirs.

4) Now think outside the box. If there are no financial or operational restrictions in an ideal world how would you deliver training?

There needs to be an individual plan with a mix of computer based classroom and video conferencing tied to skill levels.

5) What will be needed in the next five years to insure DOT personnel have the required skills to meet the demands of a rapidly changing, fast paced organization?

There needs to be strategic planning and better developed career paths. Need to develop more complex skills.

*Interpreted from a more detailed questionnaire.

STATE: Texas

Contact Name: Ray Belk
Current Position: Director

E-Mail: rbelk@dot.state.tx.us
Phone Number: 512 486-5448

1) Following is a list of three core skills needed in a DOT today and in the future. Are there similar needs in your DOT? What additional core skills are needed? Are there any Core Skills specific to Field Engineering, PM/Development, Operations and Maintenance or Administration?

| | |
|---------------------------------|----------------|
| Computer Skills | FE |
| Communication Skills | PM |
| Understanding Technology | O&M |
| | Admin |

Agreed with the above

2) Now the same question only Complementary Skills: Do you agree with the following three? Are there others needed? Are there any Complementary Skills specific to Field Engineering, PM/Development, Operations and Maintenance or Administration?

| | |
|-------------------------------|----------------|
| Customer Service | FE |
| Interpersonal skills | PM |
| Public Relation Skills | O&M |
| | Admin |

Agreed with the above added: Leadership

3) What training gaps exist?

There is a gap within the Design Engineers. He recently wrote a paper on skill gap analysis. There is also a gap in Maintenance Supervisors due to retirements.

4) Now think outside the box. If there are no financial or operational restrictions in an ideal world how would you deliver training?

We take a blended approach using in house instructors, adjunct and contractors. They use the community colleges and universities center for life long learning. They hire instructors that go to the Districts, sort of a mini university.

5) What will be needed in the next five years to insure DOT personnel have the required skills to meet the demands of a rapidly changing, fast paced organization?

Unable to answer as he ran out of time.

STATE: Utah

Contact Name: Carla Freebairn
Current Position:

E-Mail: cfreebairn@utah.gov
Phone Number: 801 965-3830

1) Following is a list of three core skills needed in a DOT today and in the future. Are there similar needs in your DOT? What additional core skills are needed? Are there any Core Skills specific to Field Engineering, PM/Development, Operations and Maintenance or Administration?

| | |
|---------------------------------|----------------|
| Computer Skills | FE |
| Communication Skills | PM |
| Understanding Technology | O&M |
| | Admin |

Agreed with the above added: Leadership skills

2) Now the same question only Complementary Skills: Do you agree with the following three? Are there others needed? Are there any Complementary Skills specific to Field Engineering, PM/Development, Operations and Maintenance or Administration?

| | |
|-------------------------------|----------------|
| Customer Service | FE |
| Interpersonal skills | PM |
| Public Relation Skills | O&M |
| | Admin |

Agreed with the above added: Budgeting skills

3) What training gaps exist?

They are doing a lot on leadership but could be doing more. Not sure of gaps with technical training.

4) Now think outside the box. If there are no financial or operational restrictions in an ideal world how would you deliver training?

It depends on training and the particular audience. It can be a combination of classroom, teleconferencing, video conferencing, web training and hands on.

5) What will be needed in the next five years to insure DOT personnel have the required skills to meet the demands of a rapidly changing, fast paced organization?

Continuing to be proactive and staying ahead of the game.

Other Comments: She does not do technical training.

STATE: Wyoming

Contact Name: David Talley
Current Position: Training Manager

E-Mail: david.talley@dot.state.wy.us
Phone Number: 307 777-4792

1) Following is a list of three core skills needed in a DOT today and in the future. Are there similar needs in your DOT? What additional core skills are needed? Are there any Core Skills specific to Field Engineering, PM/Development, Operations + Maintenance or Administration?

| | |
|---------------------------------|----------------|
| Computer Skills | FE |
| Communication Skills | PM |
| Understanding Technology | O&M |
| | Admin |

Agreed with the above added: Leadership and Supervisor skills; PM and Succession.

2) Now the same question only Complementary Skills: Do you agree with the following three? Are there others needed? Are there any Complementary Skills specific to Field Engineering, PM/Development, Operations and Maintenance or Administration?

| | |
|-------------------------------|----------------------------|
| Customer Service | FE: Managing Change |
| Interpersonal skills | PM |
| Public Relation Skills | O&M |
| | Admin |

Agreed with the above added: Ethics; Conflict management; Goal Setting; Feedback; Decision making; Stress and time management; Coaching; Facilitation; Managing meetings; and Team Building.

3) What training gaps exist?

Training gaps exist with soft skills at the executive level.

4) Now think outside the box. If there are no financial or operational restrictions in an ideal world how would you deliver training?

He would use a blended approach combining on-site standup with video conferencing. Then send them back to their workplace using on-line training then bring them back together. The Community College has some courses but they don't provide them what they need and are expensive. They are participating in the TLM video conferencing network.

5) What will be needed in the next five years to insure DOT personnel have the required skills to meet the demands of a rapidly changing, fast paced organization?

To transfer skills, they need employees to stay with them. Coming up with a way to retain employees is a part of the solution of training and developing skills. Good leadership with ways to retain employees is important.

Other Comments: They have a large percent of their employees at both ends of the bell shape curve. Currently 15% qualified to retire within five years that number jumps to 40%. That combined with the projection that people coming in the door will stay only five years presents some unique challenges.

APPENDIX C

AASHTO Subcommittee on Personnel and Human Resources Handout

AASHTO Subcommittee on Personnel and Human Resources NCHRP 20-24 (50) In-Service Training Needs for State DOT's Tuesday, April 19, 2005

When State DOT CEOs were surveyed in 2004 in preparation for the update of AASHTO's Strategic Plan, Training and Workforce Issues emerged as one of their highest priorities. One of the most pressing needs identified is that of "in-service training for both professional and technical personnel." This need is largely driven by the following factors:

- 1) Retirement of managers and technicians with many years of experience, and the need to replace them with people with far less experience. More training is needed to enable these people to handle their new responsibilities.
- 2) Downsizing of state staff and contracting out more activities means a changing role for state personnel. Instead of supervising staff to do work directly, they need to be trained in skills such as contract negotiation, contract supervision, and quality assurance to accomplish the same mission.
- 3) The mix of skills required of a state DOT have expanded. Training may be required to enable staff to communicate better in public meetings, address the growing complexity of environmental requirements, etc.
- 4) Technologies which can increase state DOT productivity and effectiveness are changing and growing more complex. Training is required so needed skills can be mastered.

These factors and many others are the impetus behind this study. In order to obtain a detailed picture of the national and state by state in-service training needs that exist today and into the future NCHRP 20-24 (50) is composed of a three-step process: First, a survey will be conducted of all AASHTO member states, second, a facilitated discussion will be held at the AASHTO Subcommittee on Personnel and Human Resources meeting on April 19, 2005 and finally, roundtable discussions will be held at each of the four regional meetings with CEO's on their view of present and future in-service training needs. Ultimately, the results of this project will accomplish the following:

- Assist AASHTO in delivering on the mandate received from the Board of Directors under Strategic Plan Goal 3. D. "Expand training opportunities and array of offerings"
- Assist the states in targeting their in-service training initiatives to their greatest needs
- Assist the Council of University Transportation Centers (CUTC) in their efforts to craft training programs that better meet state DOT needs
- Assist the Local Transportation Assistance Program (LTAP) program better target their services
- Assist the various state pooled-funded efforts, such as the Transportation Curriculum Coordinating Council (TCCC), the National Center for Pavement Preservation (NCP) and others, in better targeting training and outreach services

Many questions abound on the topic of "in-service" training which must be answered to effectively address this need in the state DOT's. These include:

- What are the specific needs for professionals across the varied service areas of a state DOT?
- What are the specific needs of technical personnel across the varied service areas of a state DOT?
- How are they being delivered today?
- Are these delivery methods effective and how do we know?
- What would the optimal delivery methods be?
- How can the process of acquiring these skill sets be accelerated?

NCHRP 20-24 (50) will begin the process of addressing this critical need among the state DOT's. Leaders in transportation agencies from across the country will benefit from a better understanding of what the needs are, where gaps exist between current and needed training, how best to deliver on that training and what future skill sets need to be developed to meet the changing demands within the industry.

During the session on Tuesday morning, April 19th, at the AASHTO Subcommittee on Personnel and Human Resources meeting in Denver, Colorado, Tom Warne of Tom Warne and Associates, LLC, the contractor on the NCHRP 20-24

(50) project will facilitate a discussion on this timely topic. This discussion will be divided into two sessions: Core and Complementary Skill Identification and In-Service Training Delivery.

The format for this discussion will be to divide the participants into groups of approximately ten (10) where they will consider each of the session topics and integrate their findings in the larger group. For the purposes of this study eight functional areas have been identified for organizing its findings. They are:

- Field Engineering
- Design Engineering
- Program Management
- Program Development
- Operations and Maintenance
- Finance and Administration
- Technology and Technical Support
- Other (Specify, e.g. Motor Vehicle Division, Drivers Licensing, Ferries, Transit, etc.)

Within each of these functional areas are employees who fall into either the professional or technical employee classes. Participants will be asked to divide their outcomes from the small group discussions into these functional areas and by professional and technical classifications.

The results from this discussion will be included in the final report prepared for NCHRP 20-24 (50). The input of the Human Resources professionals from the AASHTO states will be a valuable contribution to the body of knowledge assembled in the report for this project.

APPENDIX D

CEO's Comments

Professional In-Service Training Needs

- Logistics, supply chain
 - Prioritization (snow plow...)
 - Performance measures
 - Transportation's role in the supply chain
 - how a DOT responds and manages the system
- Project and program delivery
 - Includes other partners such as cities, counties, private sector service providers
- Age is an issue-we need to train younger employees to do more and more
- Is there a need to drop the training down a level since many of the current employees are about to retire and concentrate our efforts on the rising generation of employee?
- Is "in-service training" too narrow?
- Project management (doesn't need to be an engineer)
 - Birth to open to traffic
 - 100% committed to the project
 - Retention of trained/skilled employees
 - Understanding how to manage and prioritize and deliver the project
- Managing projects with less state employees involved
- We must develop career paths for all of our employees regardless of class or skill sets required.
- Must bring consulting community along
- There is a need to have more training in dealing with outside stakeholders, the media and public
- We can't look at training as a cost. It is an investment
- When employees seek graduate degrees it is good for them to have a diversity in their coursework-take other than engineering courses
- How can the University Transportation Centers (UTC)?

- We have to make sure that when we outsource services that those who fill roles from the private sector are also trained
- We need to change our current training model to match the environment that we are in right now
- Georgia is using DeCoster to do more training
- Training is needed to manage programs
- The programs in DOT's are changing
- One challenge is recruiting-How do you make it attractive to the new graduates to come to work for the DOT
- There isn't enough time for employees to learn their jobs through OJT
- Leadership training is critical/crucial
- We need individuals who can lead our organizations through the NEPA process
- Ethics training is important
- Training must deal with multiple layers in the DOT
- In Virginia individuals had to receive formal training before they could meet the public
- What is the right model for training employees in a state DOT?
- Is the Mineta Institute an option for filling the training gap?
- What is AASHTO doing to change their one week and three week leadership training courses to respond to the changing needs in state DOT's
- Fiscal management
 - Debt tools
 - Risk management/assignment
 - The whole array of finance issues
 - How all manage finances
- How far down do you go in providing information?
- Project management
 - Controlling and including all the elements (R of W, Construction, Design, etc.)
- Exchange program with private sector or training program
- Modal segregation

- Inclusion of other modes in traditional project delivery activities (e.g. include transit improvements with a highway project) communication, technical, relationship and modal understanding and other elements starts at the legislative.

- Employees need to better understand their agency
- Support continuing education
- Certifications available through university programs
- Certifications – FHWA, ITE
- What is the demographic for state DOT's?
- Are there training opportunities for all jobs/classifications?
- In doing leadership training we can't forget the non-engineers
- There is a need to train on dealing with elected officials
- We need more state to state interaction in advancing training
- South Carolina has both a STAR program-for senior management as well as the STEP program for junior management positions
- Many employees prefer to deal with technical issues in lieu of working with elected officials
- Need more training in dealing with the public
- Virginia has adopted a dual career path program where individuals can choose a technical track or a management track for advancement. This prevents employees from seeking management positions that they don't want nor are they best suited to fill.
- There is still some feeling that engineers must fill critical positions and in some cases, statues require a civil engineering degree
- How do we educate our employees on such issues as freight mobility and how it fits with our transportation system?
- There is a need for more information sharing among the states on such subjects as design-build, finance, and other high level topics
- Should AASHTO offer a current practices school for DOT employees?
- Not all states believe that key positions should be filled by engineers anymore
- Life is about delivery and performance. We need to train individuals to deliver
- There is a need to embrace new ideas from across the 50 states

- In Tennessee they are assigning an engineer, a PR person and an attorney to major projects
- Contract administration – all types (technology, roads, etc)
- Federal in-service training should parallel the state training
- Performance measurement and its effective use (measure things but not outcomes)
- Design and deliver of communication skills (more than PowerPoint skills)
- Recognize which things should be outsourced and it's okay
- Skills at managing people
- Our job isn't to build a transportation system, now it is to build the economic support engine for the state/nation
(This is more difficult to communicate today)
- Challenging to get employees to think globally when they are experiencing downsizing and other pressures
- Better understanding of diverse groups, the DOT and their unique needs and interests
- There is general recognition among many state CEO's of the migration of former complimentary skills migrating towards becoming necessary core skills

Technician In-Service Training Needs

- They are more highly skilled and valuable than they realize/appreciate they are
- They can do many of the engineering tasks better than young engineers
- North Carolina DOT has a strong technical program for their employees but it is not as effective on the softer skills
(e.g. leadership)
- Para professionals exist in other professions (medical, other-caution and balance are required)
- Can be project managers even if they don't seal plans
- Technicians need to have many of the same skills as those listed under "professional"
- Offer education assistance to get an engineering degree

Training Delivery

- We need to be more efficient about our training-reduce out of state travel costs
- National transportation university
- Virtual education and training
- UTC's offer on-site education

- Can't afford to send people away anymore
- Allocate the time to allow people to do the training if done in their office (virtual)
- We do well on the technical training but we need ramp up the leadership side of our programs
- Certifications that both private sector and DOT personnel participate in
- Training is a way to invest and demonstrate value in employees
- Market training as a positive aspect of an employee's development
- We can't forget the technicians in developing our training programs
- Clemson University is developing a model for trade specialists
- There is a clear need to provide technical training to our field staff
- Training results in employees seeing the big picture
- Perhaps the DeCoster program needs to have more penetration and be taken directly to the states
- Distance learning is probably part of the solution
- Is there a way to join forces with other associations such as the American Council of Engineering Companies (ACEC) or the American Society of Civil Engineers (ASCE) to deal with the training needs of state DOT's?
- Training is important to the agency and the employees
- Need to support continuing education requirements
- More national coordination of training courses and programs so that virtual training can occur
- How can we leverage LTAP to greater value for providing training?
- LTAP becomes more integrated with state DOT activities
- Michigan – Office of Grant Workforce-Examples:
 - 360 degree feedback
 - Values survey for all of state government
 - Facilitation training (reading for leading) (available by email)
- State employee training in areas that cross between multiple agencies in the same state
- Training is sporadic – we need to have continual feedback
- Leaders taking the time to formally and informally support training
- Making training compelling to elected officials

- Demonstrable results
- Private sector results (still spend \$ even in hard times)
- Tie to making the economic engine at work better
- OJT isn't going to give the employee all they need in today's world
- How do you train people to be creative?
- Need to market and institutionalize training deeper than the state DOT CEO