



Engineering Workforce Development in Transportation Agencies: A Survey of State Practice

Requested by
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Executive Summary

Background

An aging workforce coupled with an increasing attrition rate is expected to have a significant impact on the Capital Outlay Support (COS) program's workforce needs and experience levels in various job classifications. As technology continues to advance and programs are asked to do more with less, COS is seeking to learn about current practices that will aid the program's management in enhancing the skills of its workforce and developing talent and leadership within its ranks.

COS is seeking information about effective practices for enhancing the skills of an engineering workforce within a transportation agency. In particular, Caltrans is hoping to learn how other agencies are approaching continuing education and training for their engineering staff.

To assist with this effort, CTC & Associates conducted a national survey of state departments of transportation (DOTs) that examined the agencies' practices in training and developing engineering staff.

Summary of Findings

Survey of State Practice

CTC distributed a survey to representatives from human resources and project management departments of state DOTs across the country. The survey sought information about state practices to provide continuing education for engineering staff and offer development programs that enhance the skills of the agency's engineers and encourage retention of a proficient workforce. Fourteen state DOTs responded to the survey.

Job Classifications

Respondents offered a wealth of information about engineering-related job descriptions or classifications. This information, which appears in [Appendix A](#), can inform an examination of similar Caltrans job descriptions.

Elective Educational Opportunities

While respondents do not require specific continuing education for their engineering staff (apart from the continuing education requirements associated with maintaining professional licensure), it is clear that respondents are actively providing training and development opportunities for their engineering staff and other employees. All but one of the respondents offers elective educational opportunities, and several states reported providing educational opportunities that are specific to job classifications. None of the respondents provide monetary incentives to encourage employee participation in training, though some noted that an agency reimbursement for approved training costs could be seen as an incentive to participate.

Online Training

Online courses are a key part of several states' training programs. Respondents were evenly divided between using online training modules developed in-house and off-the-shelf products. Sources for off-the-shelf products include Lynda.com, National Highway Institute, RedVector, Skillssoft and Transportation Curriculum Coordination Council. Only seven respondents were

able to estimate their online training as a percentage of overall training. Responses ranged from a low of 5 to 8 percent in New Jersey, to highs of 50 percent in Florida and Washington State, and 60 to 75 percent in Missouri.

Delivering Instruction

Respondents were asked who was primarily responsible for delivering the agency's instruction: employees, consultants or a mix of both. Almost two-thirds of respondents use a mix of employees and consultants to deliver training. Most agencies use more than one mode of instruction in their internal training programs. The most commonly used mode of instruction is lecture or instructor-led training, with 11 respondents reporting its use. Online training follows closely behind, with nine agencies providing online instruction. Seminars and workshops are also fairly widely used among respondents.

Programs and Practices to Train and Develop Engineers

The following highlights some of the more notable training and development programs and practices shared by respondents.

- Idaho Transportation Department offers an Engineer-in-Training program for new engineers to earn their professional engineer license.
- Missouri DOT's Accelerated Professional Engineers Rotational Program, called APEX, was adopted statewide in 2015 after being piloted in the agency's St. Louis district. The pilot was deemed particularly successful in the areas of networking, organizational awareness and business acumen.
- New York State DOT participates in the Advanced Institute for Transportation Education scholarship program, offering 500 hours of paid release time to complete studies associated with obtaining an advanced degree in transportation at a participating university.
- Virginia DOT offers three types of development programs:
 - The agency offers three leadership programs: Leadership Development Program for Teammates for front-line employees not currently supervising subordinates; Leadership Development Program for Supervisors for new front-line supervisors; and Leadership Enhancement and Development Program for mid- to senior-level managers.
 - Launched in May 2015, a departmentwide career development program prepares employees for hard-to-fill positions. The program uses coursework, job shadowing, acting positions, coaching and mentoring to prepare employees for critical engineering positions within the department.
 - The Core Development Program annually inducts newly graduated engineers into a two-year development program intended to prepare new employees for roles as assistant resident engineers, construction managers and other critical roles.
- Wisconsin DOT recently received approval to develop a social learning community called "Connect" for the agency's Division of Transportation System Development technical staff. The respondent noted that "[w]e think this will be a perfect crossroads for the inclusion of outside consultants as subject matter experts."

External Training

Most respondents support employee participation in external training opportunities to some degree. Only one respondent—Missouri DOT—indicated that employee participation in external training is “significant.” Five states—Arkansas, Delaware, Idaho, New York and Washington—reported minimal or low levels of employee participation in external training opportunities, and three states—Delaware, Nebraska and Washington—do not encourage employee involvement in external training provided by community colleges, universities or other outside sources.

Almost all respondents provide some type of compensation for employee participation in external training. Some states reported a specific reimbursable dollar amount for participation in external training programs, while other states offer general tuition assistance or provide employees with a specified number of training days each year without the loss of pay.

Training Program Successes

Respondents were most likely to mention an in-house program when asked about training program successes. Some examples:

- Florida DOT’s annual Design Training Expo and Professional Engineer (PE) Training Program.
- Leadership and organizational culture training provided by Idaho Transportation Department.
- Missouri DOT’s Accelerated Professional Engineers Rotational Program and new learning management system, MoDOT U.
- New York State DOT’s introductory course, Introduction to the Project Development Process, and Leadership Academy.
- The Project Management Development Program offered by Virginia DOT from 2004 to 2010. Supported by contract with ESI through George Washington University, program courses incorporated Virginia DOT scenarios and targeted specific employee classes that include district project managers.

Training Program Challenges

The most frequently cited challenge in delivering training to engineers is limited funding. Other challenges reported by respondents include procurement processes, geographical constraints, lack of trainers, balancing workload and training activities, and delivering the training needed in a timely manner.

Courses Offered by Respondents

While information about the courses offered by respondents (job titles, links to position descriptions and documents provided by respondents) can be culled from a review of the survey responses in [Appendix B](#), for ease in review we compiled a list of these resources that begins on page 23.

Gaps in Findings

The scope of this Preliminary Investigation did not permit an analysis of the job descriptions and classifications provided by respondents, though such an analysis can be conducted with the information gathered for this project. While many survey respondents provided significant details about their training practices and development programs, Caltrans may wish to obtain more information about specific elements of agency programs. Other respondents provided less commentary in their survey responses, and following up with these respondents may also generate useful information for Caltrans' examination of effective workforce development practices.

Next Steps

There are many aspects of the workforce development programs and practices highlighted by respondents that Caltrans could investigate further with additional contacts or research. The following offers just a few:

- Examining the job descriptions and classifications provided by respondents to identify commonalities and differences with Caltrans positions.
- Contacting responding agencies to learn more about:
 - Delaware DOT's new mentoring program.
 - Leadership programs in Delaware, Florida, New York, Virginia and other states.
 - Missouri DOT's APEX program.
 - New York State DOT's formal and informal mentoring programs, and Wisconsin DOT's formal mentoring program for newly hired engineers.
 - Virginia DOT's recently launched departmentwide career development program, which includes coaching and mentoring to prepare employees for critical engineering positions within the department.
- Consulting with agencies using online training to learn more about the sources for such training (Lynda.com, National Highway Institute, RedVector, Skillsoft and Transportation Curriculum Coordination Council) and how online courses are used to develop engineering staff. Possible contacts include DOT staff in Idaho, Maryland, Nebraska, New Hampshire, Virginia and Washington.
- Contacting Florida and Virginia DOTs and Idaho Transportation Department to learn more about the agencies' programs geared to the development of new engineers (PE Training, Core Development Program and Engineer-in-Training, respectively).
- Consulting with agencies providing project development/project management training (Florida, New York State, Virginia and Washington State DOTs).

Detailed Findings

Survey of State Practice

To gather information about the workforce development practices used for the continuing education and training of engineering staff, we conducted a national survey of state DOTs, contacting representatives from human resources and project management departments. The survey consisted of the following questions:

1. Listed below are Caltrans engineering-related job classifications. Please provide a list of your organization's job classifications that are similar to the Caltrans classifications. If available, please also provide links to relevant documents on your web site or electronic files of the job classifications in your list.
 - **Transportation Engineer (Civil).**
The incumbent performs engineering work involving plans, designs, details and maintenance of transportation systems, in whole or in part, that may include land, rail, freeways, roads, airports, ramps, hydraulics, sanitary facilities, bridges, nonstandard major structures or transportation-related buildings and other structures.
 - **Senior Transportation Engineer.**
The incumbent may be a first-line supervisor of engineers and others engaged in transportation development activities; a specialist performing other difficult and complex engineering work; or provide technical oversight of consultants or local agency staff performing engineering work.
 - **Senior Bridge Engineer.**
Under direction, the incumbent may be a first-line supervisor to plan, direct and coordinate the design, maintenance and construction of bridges; a staff specialist that performs other difficult and complex work on specialized structure engineering projects or research studies; or a resident engineer on major structure projects.
 - **Transportation Engineer (Electrical).**
This is the entry-level professional electrical, electronic and computer engineering position within Caltrans. Incumbents work under the direction of a higher-level registered engineer.
 - **Engineering Geologist.**
This classification includes entry, working and journey level positions. Incumbents progress from working under close supervision and performing less difficult engineering geologic work to working under direction to perform difficult professional engineering geologic work.
2. Please describe your organization's continuing education requirements for each of the job classifications you listed in response to question 1.
 - A. Do you require specific professional development units for each classification?

3. Does your organization offer elective educational opportunities for your engineering staff?
 - A. What types of classes are offered?
 - B. Do these class offerings vary by job classification?
 - C. Do you provide incentives for employees to participate in elective training?
4. Do you support employee participation in massive open online courses (MOOCs)? Community college or university courses? Other outside sources for educational opportunities?
 - A. How significant is employee participation in these types of external training?
 - B. Does your organization pay for employee participation in training provided outside the organization?
5. Does your organization use the following programs or practices to train and develop engineering staff? Please describe each program or practice you employ.
 - A. Organizational support for completion of an advanced degree.
 - B. Communities of practice.
 - C. Cross-training.
 - D. Job rotation.
 - E. Leadership programs.
 - F. Mentoring/coaching.
 - G. Other practices or programs.
6. Please describe the modes of instruction (i.e., online, lecture, laboratory, workshop, seminar, independent study, self-paced, etc.) used most often in the training your organization provides.
7. If you offer online training:
 - A. Was the training developed in-house or by a consultant, or purchased as an off-the-shelf module?
 - B. Please provide examples of the online courses you offer.
 - C. Please estimate the percentage of all training you offer that is presented online.
8. Do you use employees, consultants or a mix of both to deliver instruction?
9. Do you have a catalog of educational opportunities available to your employees that you can share? If not, can you provide a representative sampling of course descriptions?
10. What successes has your organization experienced in providing or supporting training to enhance the knowledge, skills and abilities of your engineering staff?
11. What challenges has your organization experienced in providing or supporting training to enhance the knowledge, skills and abilities of your engineering staff?
12. Do you have any other comments?

We received responses from 14 state DOTs:

- Alaska.
- Arkansas.
- Delaware.
- Florida.
- Idaho.
- Maryland.
- Missouri.
- Nebraska.
- New Hampshire.
- New Jersey.
- New York.
- Virginia.
- Washington.
- Wisconsin.

(*Note:* While the New Hampshire DOT respondent provided a response to question 1, the respondent addressed the remaining questions in the survey with a general statement about the availability of National Highway Institute courses. Given this, New Hampshire DOT responses do not appear in much of the following summary of survey results.)

Given the extensive responses to question 1 about engineering job classifications, those survey responses are presented separately in [Appendix A](#). See [Appendix B](#) of this Preliminary Investigation for the full text of responses to survey questions 2 through 12.

The survey gathered information in 10 topic areas related to workforce development practices for engineering staff:

- Job classifications.
- Continuing education requirements.
- Elective educational opportunities.
- Online training.
- Delivering instruction.
- Programs and practices to train and develop engineers.
- External training.
- Training program successes.
- Training program challenges.
- Courses offered by respondents.

Key findings from the survey follow.

Job Classifications

When asked about engineering job classifications, all 14 respondents provided job titles—and many provided position descriptions—for engineering-related positions that are similar to the Caltrans engineering positions described in the survey. For those states not providing job descriptions, we found online sources that can be used to search by job title to locate job descriptions. The scope of this Preliminary Investigation did not permit an analysis of the information provided by respondents to identify similarities and differences as compared to Caltrans position descriptions.

Continuing Education Requirements

When asked about continuing education requirements, none of the respondents reported specific continuing education requirements for specific job classifications, and none require specific professional development units by classification. Several respondents noted that continuing education is associated with maintaining professional licenses, but the state DOT does not apply separate educational requirements.

While his agency does not appear to require specific continuing education credits by job classification, the New York State DOT respondent did provide information about the agency's efforts in coordinating continuing education. From the respondent:

NYSDOT is a Continuing Education Sponsor Organization of The Practicing Institute of Engineering Inc. (PIE). PIE is an organization that provides accreditation for Continuing Education in New York State. Sponsor Organizations are organization members of PIE (as defined in the Bylaws) that are capable of creating and maintaining a self-sufficient [continuing education (CE)] program. NYSDOT approves its own internal qualified training and maintains all related records. NYSDOT CE procedures, program and records are subject to audit by PIE. NYSDOT conducts CE in a manner consistent with New York State Education Department regulations and PIE procedures. NYSDOT provides CE opportunities to its employees, and promotes peer-to-peer training to the greatest extent practical.

The Office of Design (Engineering Division) administers the procedures for program areas to apply for professional development hours (PDHs) for NYSDOT-sponsored programs. NYSDOT program areas sponsoring a program or event that may qualify for PDH credits applicable to licensed Professional Engineers (PE), Landscape Architects (LA) and Land Surveyors (LS) should submit requests as directed on the Program Submittal Form & Instructions. CE coordination is also performed by the Office of Design. The CE Coordinator is the official liaison with PIE and is responsible for overseeing the CE activities in NYSDOT.

On average, NYSDOT reviews and approves 30-40 training events that qualify for PDH credits. Training events include formal classroom training, lectures, webinars and hands-on training. In 2014, we issued 1,600 certificates.

Elective Educational Opportunities

All respondents but one—Idaho Transportation Department—offer elective educational opportunities for engineering staff. Six states—Florida, Maryland, New York, Virginia, Washington and Wisconsin—reported providing elective educational offerings that vary by job classification.

Types of Classes

Respondents offer a wide range of elective courses. Some respondents provided links or documents with course titles and descriptions (see **Courses Offered by Respondents** beginning on page 23), while others offered a broader assessment of class types. Some commonalities and unique practices identified in the survey responses are summarized below.

- Courses from the National Highway Institute, the training and education arm of Federal Highway Administration, are used in eight states—Arkansas, Delaware, Idaho, Maryland, New Hampshire, New Jersey, Washington and Wisconsin.

- Some agencies work with a university partner to deliver training:
 - Delaware DOT provides training for its engineers through its T² Center of the Delaware Center for Transportation associated with the University of Delaware.
 - Virginia DOT partners with the University of Virginia Transportation Training Academy to provide engineers with a range of educational programs; see <http://www.cts.virginia.edu/workshop-catalog/> for a list of courses.
 - Wisconsin DOT's Division of Transportation System Development staff participates in training offered by the engineering departments of state universities such as the University of Wisconsin–Platteville and the University of Wisconsin–Madison.
- Florida DOT's annual Design Training Expo offers a variety of courses; see <http://www.dot.state.fl.us/officeofdesign/training/DesignExpo/2015/> for the 2015 course offerings. The agency also supports a PE Training Program (see <http://www.dot.state.fl.us/PerformanceManagement/SpecialPrograms.shtm> and <http://www.dot.state.fl.us/projectmanagementoffice/PETraining/default.shtm>).
- In Missouri, elective courses address soft skills (leadership and time management, for example). New Jersey DOT also provides soft-skill training in addition to technical training.
- External sources for online training vary by respondent:
 - Maryland, Virginia and Washington State DOTs use Skillsoft online training (see <http://www.skillsoft.com/> to learn more about Skillsoft).
 - Nebraska Department of Road uses Lynda.com (see <http://www.lynda.com/>).
 - New York State and Virginia DOTs use RedVector to deliver online training to engineers (see <https://www.redvector.com/> to learn more about RedVector). Most of the RedVector modules used by New York State DOT have been approved for professional development hour credits. Currently 50 New York State DOT engineers are participating in RedVector training.
 - Virginia and Maryland DOTs use online training developed by Transportation Curriculum Coordination Council—sometimes referred to as TC3—a training partnership of Federal Highway Administration, state DOTs and the highway transportation industry (see <http://tc3.transportation.org/> to learn more about TC3).

(Note: See **Online Training**, which begins on page 11, for more information about respondents' use of online training.)

Incentives to Participate

When asked if their agencies provide incentives for employees to participate in elective training, none of the respondents reported the provision of monetary incentives. Three respondents reported some type of incentive, which in some cases takes the form of reimbursement for approved education and training.

- The Alaska DOT & Public Facilities respondent noted that while the agency offered no monetary incentive, there were other reasons employees would be encouraged to participate in training, including the opportunity to improve, credit on a State of Alaska transcript and certificates of completion.

- While Florida DOT offers no formal incentive, when training is approved, the agency covers the expense of approved courses. In most cases, the agency considers training as time worked.
- The Virginia DOT respondent noted that his agency “supports the pursuit of elective educational opportunities for all employees to include our engineering staff. VDOT engineer participation in any of these courses is fully funded including travel when approved for attendance.”

Online Training

We asked respondents about their internal online training programs—who developed the training modules used and an estimate of the percentage of training that is presented online. While not a specific question in the survey, the use of learning management systems for delivering online training was reported by five states—Missouri, Nebraska, New Jersey, New York and Washington.

Responsibility for Development

Respondents were evenly divided between using online training modules developed in-house and off-the-shelf products. Some states use a mix of three approaches—in-house or consultant-produced programs, and off-the-shelf products. The table below summarizes survey responses; a specific product or provider is indicated if noted by the survey respondent.

Respondents’ Online Training Programs—Developers and Sources		
Online Product Development	Agency	Comment / Product or Provider
Developed by consultants	New York, Washington, Wisconsin	N/A
Developed in-house	Florida, Maryland, Nebraska, New Jersey, New York, Virginia, Washington, Wisconsin	<p><i>Maryland and Nebraska.</i> Used for some of the agency’s training.</p> <p><i>New Jersey.</i> Used in connection with in-house administrative practices.</p> <p><i>Virginia.</i> Used for systems or agency-specific material; all materials recertifications have an in-house-developed online component.</p>

Continued on next page

Respondents' Online Training Programs—Developers and Sources		
Online Product Development	Agency	Comment / Product or Provider
Off-the-shelf product	Idaho, Maryland, Missouri, Nebraska, New Hampshire, New Jersey, Virginia, Washington, Wisconsin	<p><i>Idaho.</i> National Highway Institute.</p> <p><i>Maryland.</i> National Highway Institute, Skillsoft and Transportation Curriculum Coordination Council.</p> <p><i>Nebraska.</i> Lynda.com.</p> <p><i>New Hampshire.</i> National Highway Institute.</p> <p><i>New Jersey.</i> National Highway Institute.</p> <p><i>Virginia.</i> Federal Highway Administration, PMI-developed project management body of knowledge training; interpersonal skills provided by Skillsoft; courses from Transportation Curriculum Coordination Council.</p> <p><i>Washington.</i> Online self-paced learning from Skillsoft.</p>
Other state agency products	Virginia	N/A

Online Training as Percentage of All Internal Training

Not all respondents offering online training were able to estimate the level of its use as compared to other modes of internal training. The following table shows the estimates provided, from low to high.

Respondents' Percentage of Online Training	
Online Training as % of All Training	Agency
5 to 8	New Jersey
10	Maryland
25	Nebraska
30	New York
50	Florida, Washington
60 to 75	Missouri

Delivering Instruction

Respondents were asked who was primarily responsible for delivering the agency’s instruction—employees, consultants or a mix of both. Almost two-thirds of respondents use a mix of employees and consultants to deliver training. The table below summarizes survey responses.

Responsibility for Delivering Instruction		
Party Delivering Instruction	Agency	Comment
Mix of employees and consultants	Alaska, Florida, Idaho, Missouri, Nebraska, Virginia, Washington, Wisconsin	<i>Nebraska.</i> Internal trainers used for soft-skill courses, consultants for technical or engineering-related courses. Also work with Local Technical Assistance Program. <i>Virginia.</i> Internal trainers deliver leadership and materials certification training; consultants used for on-demand training.
Mix of employees and consultants (primarily consultants)	Arkansas, Delaware	N/A
Primarily in-house subject matter experts	New York	The agency also uses consultants.
Primarily consultants	Maryland, New Jersey	<i>New Jersey.</i> Internal subject matter experts used when possible.

Modes of Instruction

Most agencies use more than one mode of instruction in their internal training programs. The most commonly used mode of instruction is lecture or instructor-led, with 11 respondents reporting its use. Online training follows closely behind, with nine agencies providing online instruction. Seminars and workshops are also fairly widely used among the respondents. The table below summarizes survey responses.

Modes of Instruction Used by Respondents		
Mode of Instruction	Agency	Comment
Conferences	Florida, Missouri	N/A
Independent study	Alaska, Maryland, Missouri, New Jersey, Wisconsin	N/A
Laboratory	Idaho, Maryland, New Jersey, Wisconsin	N/A

Modes of Instruction Used by Respondents		
Mode of Instruction	Agency	Comment
Lecture (instructor-led)	Arkansas, Delaware, Florida, Idaho, Maryland, Missouri, Nebraska, New Jersey, New York, Virginia, Wisconsin	<p><i>Nebraska.</i> Most training is conducted using the traditional classroom setting.</p> <p><i>New Jersey.</i> Principal mode is instructor-led training, with lesser focus on online training or a blended method.</p> <p><i>New York.</i> This is the most commonly used mode of training.</p> <p><i>Virginia.</i> Majority of training is instructor-led offerings.</p>
Online	Florida, Idaho, Maryland, Missouri, Nebraska, New Jersey, Virginia, Washington, Wisconsin	<p><i>Nebraska.</i> Online courses are provided through Lynda.com on a statewide contract.</p> <p><i>Virginia.</i> Focus is on soft skills and system-specific material.</p> <p><i>Washington.</i> Skillsoft training is the most easily accessed type of training.</p> <p><i>Wisconsin.</i> While traditionally most instruction was done in classrooms, online learning events are “very popular and growing in number.”</p>
Self-paced	Maryland, Missouri, New Jersey, Wisconsin	N/A
Seminar	Alaska, Arkansas, Delaware, Maryland, Missouri, New Jersey, Wisconsin	N/A
Webinar / online collaborative learning environments	New York, Wisconsin	<i>New York.</i> The agency uses WebEx for short-duration classes (1 hour).
Workshop	Alaska, Arkansas, Delaware, Florida, Idaho, Maryland, New Jersey, Wisconsin	N/A

Programs and Practices to Train and Develop Engineers

We asked respondents to indicate whether their agencies support certain programs and practices to train and develop engineering staff. The following summarizes respondents' application of:

- Organizational support for completion of an advanced degree.
- Communities of practice.
- Cross-training.
- Job rotation.
- Leadership programs.
- Mentoring or coaching.
- Other programs and practices.

Organizational Support for Completion of an Advanced Degree

Five states—Alaska, Arkansas, Delaware, Washington and Wisconsin—do not provide support for completion of an advanced degree. Other states indicated that such support is limited to schedule accommodations (Florida) or provided to some degree (Idaho and Maryland).

Four states—Missouri, Nebraska, New Jersey and Virginia—offer a tuition assistance program. New York State DOT participates in the Advanced Institute for Transportation Education scholarship program for one to two individuals per year. This program offers 500 hours of paid release time to support obtaining an advanced degree in transportation at a participating university.

Communities of Practice

Six respondents reported some application of communities of practice. In Florida, communities of practice are not used for training directly, but are used by task teams as they develop guidance or improve practices. The Maryland State Highway Administration respondent indicates that his agency offers communities of practice “to some degree.” In Missouri, these training tools are not supported internally, but are used by engineering staff through professional organizations. Virginia DOT supports the use of communities of practice both inside and outside the agency, while Nebraska Department of Roads uses them informally. Finally, Washington State DOT noted Lean (a set of management principles) as an example of the application of a community of practice in which engineering staff participates.

Cross-Training

All but three states—Arkansas, Delaware and New York—offer cross-training for engineering staff. Some states apply this practice in a limited or informal manner (Idaho, Maryland, Nebraska, New Jersey and Washington). In Virginia, support of cross-training is determined by operational leaders at all levels of the organization, while Missouri DOT supports cross-training both informally and formally through job rotation. Other states indicated that their agencies support cross-training but did not provide specifics about how it is implemented (Alaska, Florida and Wisconsin).

Job Rotation

The most robust job rotation program described by respondents is Missouri DOT's APEX program. As the survey respondent noted:

Statewide adoption of the APEX program took place in 2015. Prior to that, the program was piloted in the St. Louis district with great success (anecdotally measured through participant and supervisor satisfaction survey results), particularly in the areas of networking, organizational awareness and business acumen.

Other states offering an informal, limited or varied job rotation program include Florida, Maryland, Nebraska, New York, Washington and Wisconsin. New York State DOT offers a limited rotation program for entry-level engineers. The Washington State DOT respondent noted that job rotation is used less frequently today than it had been in the past.

Leadership Programs

Among respondents, only Arkansas does not provide some type of leadership program. The table below summarizes survey responses that provided some detail about the leadership program offered.

Respondents' Leadership Programs		
State	Program	Description
Alaska	Leadership Development Program	<ul style="list-style-type: none"> Participants selected based on job performance. Includes three workshops, strength-building exercises, virtual consults and peer learning teams.
Delaware	Annual Leadership Academy	<ul style="list-style-type: none"> Started in 2014. Five-week program covers leadership topics, state government and DeIDOT 101. One employee selected from each division; some are nonengineers.
Florida	Supervisors, Management, Leadership and Graduate Leadership academies	All four leadership programs are described in this web site: http://www.dot.state.fl.us/PerformanceManagement/Academies.shtm .
Idaho	Internal program	The "robust" internal program is designed to align with the agency's strategic goals and organizational culture.
New Jersey	Certified Public Manager course of study through Rutgers University	For entry-level supervisors to higher-level management staff.

Respondents' Leadership Programs		
State	Program	Description
New York	Leadership academies	<ul style="list-style-type: none"> Started in 2010. Each of two leadership academies to date have been delivered off-site and involved 14 days of training over one year. Requires a leadership project for graduation. Each academy trains up to 50 cross-discipline participants. Another academy is planned for 2016 or 2017, which will be jointly conducted with the Department of Environmental Conservation and train up to 25 NYSDOT participants.
Virginia	<ul style="list-style-type: none"> Leadership Development Program for Teammates (LDP-T) Leadership Development Program for Supervisors (LDP-S) Leadership Enhancement and Development Program (LEAD) 	<ul style="list-style-type: none"> LDP-T is intended for front-line employees not currently supervising subordinates; one day a week for 10 weeks. LDP-S is a 10-month course for new front-line supervisors and includes both classroom and online courses; culminates with a two-day capstone event. LEAD is intended for mid- to senior-level managers; features classroom work, peer coaching, learning circles and job exchanges.

Mentoring or Coaching

Three agencies provided details of existing or recently launched formal mentoring programs:

- New York State DOT has a formal mentoring program with limited participation (two to three new applicants per year). With the formal program, the agency is directly involved in selection of a suitable mentor for an employee upon request. Informal mentoring is more active, which involves self-initiated establishment of a mentoring relationship. The survey respondent estimates that 50 percent of new employees are involved in an informal mentoring relationship within their first year of joining the agency.
- In May 2015, Virginia DOT launched a departmentwide career development program intended to prepare employees for hard-to-fill positions. The program uses coursework, job shadowing, acting positions, coaching and mentoring to prepare employees for critical engineering positions within the department.
- Wisconsin DOT has a formal mentoring program for new hires. New employees are paired with a more senior engineer and attend workshops on various topics presented by the mentoring committee members.

Two agencies are just beginning a mentoring program (Delaware DOT) or are planning to (Idaho). The Alaska, Nebraska and Washington State respondents reported informal programs. While Florida DOT has no formal mentoring program, the activity is supported. Only two agencies—Arkansas and New Jersey—reported no use of mentoring or coaching in their agencies.

Other Programs and Practices

Respondents offered other examples of programs and practices to train and develop engineering staff:

- Delaware DOT sends up to six engineers to the AASHTO national conferences each year.
- Florida DOT offers its annual Design Training Expo and other discipline-specific conferences.
- Idaho Transportation Department offers an Engineer-in-Training program for new engineers to earn their professional engineer license.
- The Virginia DOT respondent described the agency's Core Development Program (CDP) as its "primary pipeline program." CDP inducts a number of newly graduated engineers each year (19 for 2016) into a two-year development program intended to prepare new employees for roles as assistant resident engineers, construction managers and other critical roles. Job rotations and cross-training are used to expose participants to a variety of developmental opportunities.

As a precursor to CDP participation, Virginia DOT will recruit as well as provide stipends and summer employment to 12 new Engineer Scholars in 2016. The agency expects the Engineer Scholars will begin the CDP program following their graduation.

In a separate program, the department recruits undergraduate and graduate college students (33 in 2016) each year to serve as summer interns in business and engineering positions.

- Wisconsin DOT recently received approval to develop a social learning community called "Connect" for the agency's Division of Transportation System Development technical staff. The respondent noted that "[w]e think this will be a perfect crossroads for the inclusion of outside consultants as subject matter experts."

External Training

Most respondents support employee participation in external training opportunities. Only three states—Delaware, Nebraska and Washington—do not encourage employee involvement in external training provided by community colleges, universities or other outside sources. In March 2015, Delaware DOT stopped offering educational assistance due to budgetary constraints. Prior to this, educational assistance had been used for college courses and the professional engineer exam review course.

Six states—Alaska, Arkansas, Florida, Idaho, Missouri and Virginia—reported specific support for employee participation in community college or university courses.

- In Arkansas, the department supports employees taking a university course if it is done on the employee's own time, or the timing of the class will not disrupt work production

and the employee can make up the time. The department does not pay for this type of continuing education.

- Florida DOT employees may be approved to attend training when it is job-related. State employees are allowed a tuition waiver for six credits per semester (if space is available). Attendance in college courses is not considered time worked.

In New Jersey, support for external training is limited to online courses based on the applicability of the program.

We prompted respondents to indicate whether they encouraged participation in massive open online courses (called “MOOCs”), but only three agencies responded specifically with regard to MOOC participation. In Alaska, employees do not participate in MOOCs, but individuals can take college courses when approved through the proper supervisor chain of command. In Virginia, the respondent noted that “[t]he VDOT Learning Center does not currently advocate for participation in MOOCs.” The Wisconsin DOT respondent noted that “[e]ngineering is technical enough that we find little value in MOOC-style online offerings.”

Level of Participation

Only Missouri DOT indicated that employee participation in external training is “significant.” Five states—Arkansas, Delaware, Idaho, New York and Washington—reported minimal or low levels of employee participation in external training opportunities. Of those agencies providing a specific estimate, Delaware DOT estimated participation at 2 percent of all staff when the training program was funded, and New Jersey DOT reported that 8.6 percent of all employees (300 of 3,500 employees) participate in the agency’s Career Development/Tuition Aid program.

Compensation for Employee Participation in External Training

All but one survey respondent—Washington State DOT—provided some type of compensation for employee participation in external training. These agency practices are summarized below.

- Some states reported a specific reimbursable dollar amount to compensate employees for participation in external training programs:
 - In Alaska, employees are reimbursed up to \$3,000 annually for mandatory training; \$1,000 is available for nonmandatory training. Nonmandatory training requires a reimbursement agreement if more than \$500 per year.
 - A Delaware DOT program offered \$5,000 per employee to pay for college courses and the professional engineer exam review course. The program was discontinued in March 2015 due to budget constraints.
 - For those enrolled in approved degree programs, Virginia DOT will pay up to \$5,250 per year in tuition assistance provided the employee meets grade requirements established by the agency.
- Other states offer general tuition assistance:
 - All career service plan and executive service Maryland State Highway Administration employees are eligible for the Advanced Education/Tuition Reimbursement Program.
 - Missouri DOT offers tuition assistance and reimburses employees for engineering-related training and testing.

- New Jersey DOT offers a tuition aid program that provides direct reimbursement upon successful completion of the training program.
- Some states consider relevance to the employee’s job when determining whether to pay for external training:
 - In Arkansas, employees are paid for participation in external training if the supervisor has instructed the employee to attend.
 - Florida DOT will pay for training when the educational opportunity is job-related and if the budget allows.
- Other practices:
 - New York State DOT participates in the Advanced Institute for Transportation Education scholarship program. Scholarships are awarded by the University Transportation Research Center for up to two years of study toward an advanced degree in transportation at a participating university. The actual value in tuition support is \$25,000. New York State DOT “matches” the scholarship by allowing 500 hours of paid release time to complete studies. This program may have one or two candidates per year.
 - Wisconsin DOT takes a slightly different approach to compensation, providing five days of training during each calendar year without loss of pay. Management may approve payment of all, or a portion of, related travel expenses and event fees.

Other states simply indicated that funding was available to reimburse employees for external training and did not elaborate on specific policies (Idaho and Nebraska).

Training Program Successes

We asked respondents what has proved to be particularly successful in their training and education programs. The table on the next page presents highlights of survey responses.

Respondent Successes in Providing or Supporting Training		
Successful Practice / Benefit	Agency	Comment
Improves morale	Delaware	N/A
In-house programs	Florida, Idaho, Missouri, New York, Virginia, Washington	<p><i>Florida.</i> Design Expo, PE Training Program.</p> <p><i>Idaho.</i> Leadership and organizational culture training.</p> <p><i>Missouri.</i> APEX; new learning management system, MoDOT U, to access online courses.</p> <p><i>New York.</i> Introduction to the Project Development Process introductory course; NYSDOT Leadership Academy.</p> <p><i>Virginia.</i> Project Management Development Program.</p> <p><i>Washington.</i> Robust training for project development led to growth in project management, cost risk assessment, value engineering and practice design implementation in the agency.</p>
In-house training provides CE credits	Arkansas	N/A
Employees prepared for promotional opportunities	Alaska, Delaware	N/A
Recruiting and internship programs	Missouri	N/A
Retention, more engaged staff	Maryland, Wisconsin	<i>Maryland.</i> The agency is instituting competency-based assessments.

The following provides additional information about two of the successes noted in the table above. Additional information about other in-house programs highlighted in this table can be found elsewhere in this summary of survey findings and is also available in [Appendix B](#).

- The best candidates from New York State DOT’s Leadership Academy were selected to form a cohort that functions “much like a community of practice and are a candidate pool for well-prepared leaders to meet the succession planning needs of NYSDOT for several years.”
- The excerpt below from the Virginia DOT survey response highlights a program designed to prepare project managers:

From 2004 to 2010, the VDOT Learning Center ran a structured Project Management Development Program, supported in large measure by contract with

ESI through George Washington University. Courses were modified to incorporate VDOT scenarios and targeted the audience below.

Once VDOT reached saturation with existing project management employees, we moved from this structured approach to ad hoc, utilizing UVA Transportation Training Academy (formerly LTAP) and a two-week Transportation Project Management Institute (also run by UVA).

Virginia DOT Role	Training Level
Residency Project Manager (Contract Administrator, Maintenance, etc.)	Local Technical Assistance Program (LTAP) One-day class – overview
District Maintenance, Project Manager (Traffic Engineering, Structure & Bridge, etc.)	ESI <ul style="list-style-type: none"> • Project Planning • Analysis and Control
District ‘Dual-Hat’ Project Manager (Location & Design, Structure & Bridge)	ESI – level one, Associate’s Certificate
Dedicated Project Manager and Project Management Office	ESI – level two, Master’s Certificate
Major/Mega Projects Project Manager	PMP [Project Management Professional] Certification

Training Program Challenges

The most frequently cited challenge in delivering training to engineers is limited funding, with eight states—Delaware, Florida, Idaho, Missouri, Nebraska, New York, Washington and Wisconsin—noting this concern. Procurement processes introduce another hurdle for New Jersey DOT. Other challenges cited by respondents are summarized below.

- Missouri and Wisconsin DOTs highlighted a lack of trainers, while for Nebraska Department of Roads, finding the right training to meet employee needs can be challenging.
- Geography poses a challenge for Alaska and Wisconsin DOTs.
- Staffing-related issues were raised by Missouri DOT (turnover) and New York State DOT (a shrinking workforce). In Maryland, balancing workload and training and development activities can present challenges.
- Timing is an issue for New York State DOT, with the respondent highlighting the difficulty of accelerated schedules. The New Jersey and Wisconsin DOT respondents also commented on timing, noting that it can be challenging to deliver needed training programs in a timely manner.

Courses Offered by Respondents

Respondents provided course titles, links to course descriptions and documents describing training opportunities. The following summarizes the course information provided by respondents.

Alaska

- Training calendar for research, development and technology transfer: <http://dot.alaska.ecatts.com/lmsTrainingCalendar>.
- LearnAlaska: <http://doa.alaska.gov/dof/learnalaska/>.
- Course schedule: <http://doa.alaska.gov/dof/learnalaska/sections.xsl>.

Delaware

The agency does not have a catalog. The respondent provided a list of some of the courses offered over the last few years; see [Appendix B](#), page 4, of this Preliminary Investigation.

Florida

- Office of Design Training and Development page: <http://www.dot.state.fl.us/officeofdesign/Training/>.
- Professional Engineer Training Program: <http://www.dot.state.fl.us/PerformanceManagement/SpecialPrograms.shtm> and <http://www.dot.state.fl.us/projectmanagementoffice/PETTraining/default.shtm>.
- Annual Design Training Expo: <http://www.dot.state.fl.us/officeofdesign/training/DesignExpo/2015/>.
- Project management training: <http://www.dot.state.fl.us/projectmanagementoffice/PMHandbook/default.shtm>.
- Design training: <http://www.dot.state.fl.us/officeofdesign/Training/default.shtm>.
- CADD training: <http://www.dot.state.fl.us/ecso/downloads/webinars/Posted.shtm#loadSection>.
- Other training: <http://www.dot.state.fl.us/PerformanceManagement/SpecialPrograms.shtm>.

Office of Design Training Plan, Florida DOT, Fiscal Year 2015-2016.

See [Appendix D](#).

This document describes the training available to Florida DOT employees for the current fiscal year.

Training Catalog, Florida DOT, undated.

See [Appendix E](#).

This 38-page document provides a listing of classes available to Florida DOT employees organized by course ID.

Maryland

Training and Development Catalog, Maryland State Highway Administration, 2015.
See [Appendix H](#).

This catalog includes instructions for professional development plans, training and development programs and courses, and online course descriptions.

Graduate Engineer Training Program Handbook, Maryland State Highway Administration, Class of 2018.

See [Appendix I](#).

This handbook describes the training program for graduate engineers, including the project development process, project meetings, rotational assignments and training courses.

Transportation Engineer Curricula, Maryland State Highway Administration, undated.

See [Appendix J](#).

This Excel spreadsheet lists, by classification, the courses provided for each job class.

Missouri

Active Online Courses, Missouri DOT, undated.

See [Appendix L](#).

This spreadsheet lists online courses available to all Missouri DOT employees.

Nebraska

Workforce Development Training Catalog, Human Resources Workforce Development, Nebraska Department of Roads, October 2014.

See [Appendix M](#).

This catalog includes the required courses for new employees, course descriptions and details of special training programs such as the Leadership Development Program, and job-specific and technical training.

New York

Examples of online courses include:

- Introduction to the Project Development Process (developed in-house).
- Technical Writing (four modules developed by consultant, RedVector).
- Roadside Design training modules (developed in-house using Adobe Captivate).
- MicroStation (CADD) online tutorials (developed in-house using Adobe Captivate).

The agency purchases annual online learning licenses called the Empire Knowledge Bank. These licenses are inexpensive (\$23.04) and available to employees on request. A list of course titles is available at <http://www.enterprisetraining.com/catalogs-gp.html>. The agency's employees have access to the Professional Development & Business library of courses.

Washington

The WSDOT Learning Management System is available at <http://www.wsdot.wa.gov/publications/fulltext/design/cae/training/LMS%20output/story.html>.

Engineering Workforce Development in Transportation Agencies: A Survey of State Practice

Appendices

Appendix A:	Survey Results (Question 1).....
Appendix B:	Survey Results (Questions 2 through 12).....
Appendix C:	Alaska DOT & Public Facilities Training, Policy and Procedure No. 02.04.010 ..
Appendix D:	Florida DOT Office of Design Training Plan
Appendix E:	Florida DOT Training Catalog.....
Appendix F:	Florida DOT District Design Office Organizational/Career Progression Chart.....
Appendix G:	Maryland State Highway Administration Transportation Engineering Job Classifications
Appendix H:	Maryland State Highway Administration Training and Development Catalog.....
Appendix I:	Maryland State Highway Administration Graduate Engineer Training Program Handbook.....
Appendix J:	Maryland State Highway Administration Transportation Engineer Curricula
Appendix K:	Maryland State Highway Administration Advanced Education/Tuition Reimbursement Program.....
Appendix L:	Missouri DOT Active Online Courses
Appendix M:	Nebraska Department of Roads Workforce Development Training Catalog
Appendix N:	New Jersey DOT Engineering Job Titles
Appendix O:	Virginia DOT Project Management Program
Appendix P:	Virginia DOT Transportation Engineer Job Descriptions
Appendix Q:	Virginia DOT Senior Transportation Engineer Job Descriptions.....
Appendix R:	Virginia DOT Senior Bridge Engineer Job Descriptions
Appendix S:	Virginia DOT Geologist Job Descriptions
Appendix T:	Washington State DOT Training-Design

Appendix A: Survey Results (Question 1)

Responses to survey question 1 are provided in this separate appendix to allow for a more straightforward review and comparison of the wealth of job classification information provided by respondents. [Appendix B](#) provides the full text of responses to survey questions 2 through 12.

Respondents were asked this question:

Listed below are Caltrans engineering-related job classifications. Please provide a list of your organization's job classifications that are similar to the Caltrans classifications. If available, please also provide links to relevant documents on your web site or electronic files of the job classifications in your list.

- **Transportation Engineer (Civil).**
The incumbent performs engineering work involving plans, designs, details and maintenance of transportation systems, in whole or in part, that may include land, rail, freeways, roads, airports, ramps, hydraulics, sanitary facilities, bridges, nonstandard major structures or transportation-related buildings and other structures.
- **Senior Transportation Engineer.**
The incumbent may be a first-line supervisor of engineers and others engaged in transportation development activities; a specialist performing other difficult and complex engineering work; or provide technical oversight of consultants or local agency staff performing engineering work.
- **Senior Bridge Engineer.**
Under direction, the incumbent may be a first-line supervisor to plan, direct and coordinate the design, maintenance and construction of bridges; a staff specialist that performs other difficult and complex work on specialized structure engineering projects or research studies; or a resident engineer on major structure projects.
- **Transportation Engineer (Electrical).**
This is the entry-level professional electrical, electronic and computer engineering position within Caltrans. Incumbents work under the direction of a higher-level registered engineer.
- **Engineering Geologist.**
This classification includes entry-, working- and journey-level positions. Incumbents progress from working under close supervision and performing less difficult engineering geologic work to working under direction to perform difficult professional engineering geologic work.

Respondents took a variety of approaches in answering this question. Some provided job titles and links to job classifications, while others provided supporting documents or included detailed job descriptions in their survey responses.

Some of the survey responses that follow have been reformatted or slightly edited to allow for ease in review. When a respondent agency's position titles are compared with Caltrans positions, the Caltrans job title appears above the respondent agency's job title.

Alaska

Contact: Shelly M. Saviers, Human Resource Consultant, Alaska DOT and Public Facilities (DOT&PF), 907-465-8124, shelly.saviers@alaska.gov.

- **Transportation Engineer (Civil).**

Similar Alaska DOT & PF positions: Engineer/Architect series.

Engineer/Architect I:

<http://agency.governmentjobs.com/alaska/default.cfm?action=viewclassspec&classSpecID=889997&viewOnly=yes>

Engineer/Architect II:

<http://agency.governmentjobs.com/alaska/default.cfm?action=viewclassspec&classSpecID=890000&viewOnly=yes>

Engineer/Architect III:

<http://agency.governmentjobs.com/alaska/default.cfm?action=viewclassspec&classSpecID=890002&viewOnly=yes>

Engineer/Architect IV:

<http://agency.governmentjobs.com/alaska/default.cfm?action=viewclassspec&classSpecID=890006&viewOnly=yes>

Engineer/Architect V:

<http://agency.governmentjobs.com/alaska/default.cfm?action=viewclassspec&classSpecID=890009&viewOnly=yes>

- **Senior Transportation Engineer.**

Similar Alaska DOT & PF positions: Engineer/Architect II-V (same class specs as above).

- **Senior Bridge Engineer.**

Similar Alaska DOT & PF positions: Technical Engineer II / Architect II.

Technical Engineer II / Architect II:

<http://agency.governmentjobs.com/alaska/default.cfm?action=viewclassspec&classSpecID=892064&viewOnly=yes>

- **Engineering Geologist.**

Similar Alaska DOT & PF positions: Engineering Geologist I-III and Chief Engineering Geologist and Regional Engineering Geologist.

Engineering Geologist I:

<http://agency.governmentjobs.com/alaska/default.cfm?action=viewclassspec&classSpecID=890045&viewOnly=yes>

Engineering Geologist II:

<http://agency.governmentjobs.com/alaska/default.cfm?action=viewclassspec&classSpecID=890075&viewOnly=yes>

Engineering Geologist III:

<http://agency.governmentjobs.com/alaska/default.cfm?action=viewclassspec&classSpecID=890080&viewOnly=yes>

Chief Engineering Geologist:

<http://agency.governmentjobs.com/alaska/default.cfm?action=viewclassspec&classSpeclD=889772&viewOnly=yes>

Regional Engineering Geologist:

<http://agency.governmentjobs.com/alaska/default.cfm?action=viewclassspec&classSpeclD=891865&viewOnly=yes>

Arkansas

Contact: Carla Edwards, Personnel Staff Coordinator, Arkansas State Highway & Transportation Department, 501-569-2431, carla.edwards@ahtd.ar.gov.

See our job descriptions at the following link:

http://www.arkansashighways.com/Employment/class_spec_manual.aspx.

The respondent also noted:

- Any entry-level engineers are in the Engineer title.
- No Engineering Geologist—just Geologist.

Delaware

Contact: Shanté A. Hastings, Deputy Director, Transportation Solutions, Delaware DOT, 302-760-2835, shante.hastings@state.de.us.

Note: The respondent indicated that DeIDOT's Civil Engineer Program Manager I is similar to Caltrans' Senior Bridge Engineer. The agency does not employ electrical or computer engineers or geologists.

Engineer I

This is the entry level in the engineering series designed to develop professional capabilities through application of established standards, techniques, procedures and criteria in carrying out segments of related engineering tasks.

- Work is performed under the close supervision of a technical superior.
- Participates in reviewing engineering plans and specifications, permit and construction grant applications and/or related documents for compliance with state/federal laws and regulations; recommends approval, disapproval or need for revision based on regulatory requirements and sound engineering principles and theories.
- Makes recommendations regarding proposed and/or existing projects and their compliance with state/federal regulatory requirements.
- Contacts include participating with other technical personnel in implementing and monitoring projects.

Engineer II

This is the full performance level in the engineering series responsible for independently evaluating, selecting and applying engineering techniques, procedures and criteria and using judgment in making adaptations and modifications.

- Work is performed under the general supervision of a technical superior.
- Prepares and/or reviews engineering plans and specifications for proposed projects; recommends modifications.
- Performs production-type work involving conventional types of design plans, investigations, surveys, structures and equipment having relatively few complex features; or the implementation and monitoring of statewide water and air resources, solid/hazardous waste management, and construction grant administration programs.
- Assists in the administration of contracts, projects, materials testing and evaluation.
- Prepares evidence for court action and public hearings regarding compliance with laws, rules and regulations.
- Oversees the work performed by technicians for assigned projects.
- Contacts include associates in the department and in other program areas, federal and state regulatory agencies, general public organizations and interest groups regarding proposed or current laws, rules and regulations pertaining to projects and to maintain a cooperative and understanding relationship.

Engineer III

This is the project lead level.

- Reports to an administrative or technical superior.
- Functions as project supervisor, planning, coordinating, evaluating, and reporting results and to negotiate and oversee the work of lower level engineers, technicians and consultants assigned to carry out major components of work.
- Accountable for effective and efficient completion of several projects simultaneously. Provides guidance and assistance on complex coordination matters and in modifying design and construction methods.
- Participates in developing and implementing engineering policies and procedures and recommends revisions and implementation of new projects.
- Reviews plans prepared by consulting firms with special attention to unusually complex components of the contract/project.
- Administers contracts, projects, materials testing and evaluation.
- Supervises multiple testing units in the Material Testing and Research laboratory, and conducts research projects of moderate complexity.
- Prepares evidence for court, testifies as a witness for the State, prepares engineering reports involving analysis of findings and reviews special reports prepared by lower level staff for technical accuracy and regulatory compliance.

- Prepares impact statements and draft permits; notifying municipal, industrial/commercial representative on needed revisions; making recommendations on corrective action; initiating enforcement procedures.
- Contacts include acting as liaison between the department, municipalities, commercial/industrial organizations and federal regulatory agencies regarding compliance, funding and research.

Engineer IV

This is the advanced engineering level responsible for developing objectives, policies, procedures, and providing technical guidance in the implementation and design of complex projects.

- Performs as staff advisor and consultant with expertise in a technical specialty. Acts as an engineering expert involved in the planning, design or construction of projects. Provides expert technical guidance and assistance to department personnel, agencies, outside consultants and contractors.
- Involved in complex and diverse activities involving a variety of related disciplines, which include interpretation and functional implementation of rules, regulations, standards, procedures and policies.
- Develops, initiates, and implements new concepts, procedures and techniques into division or statewide programs and projects.
- Reviews work for assigned areas to ensure standards, program objectives/goals and regulatory compliance are met.
- Contacts include preparing legislative and regulatory measures; providing technical assistance to the Attorney General's Office regarding enforcement action; testifying in court and public hearings as an expert State witness and may respond to emergency situations. Interacts with representatives from local, county and federal government, other state agencies and others interested in and/or concerned with department programs and projects.

Engineer V

This level functions as an engineering expert involved in the design and construction of division projects. Typically assigned to multi-disciplined programs and projects. Acts as a recognized regional or national leader and authority for a technical specialty. Recognized expert in one or more specialties dependent upon the complexity of the area(s) of specialization.

- Accountable for problem solving in unique situations thereby averting reliance upon outside consultants.
- Originates, develops, designs, introduces and oversees projects and innovative research in the development of programs and projects and enhancements to existing programs and projects.
- Assists the division by testifying as an expert for the state in court and public hearings, and providing insight, coordination and expert consulting services on issues and topics involving engineering disciplines.
- Prepares program and project assessments, progress reports and budgetary and special reports upon request.

- Contacts include providing expert technical direction, guidance and assistance to division personnel, federal/state agencies, industry and private sector organizations.

Civil Engineer Program Manager I

This level is responsible for supervising and managing assigned projects and programs and is accountable for the technical decisions made, accepted and implemented within the Department of Transportation.

- Reports to an administrative superior and is responsible for managing programs that require integration of engineering principles and practices.
- Supervises professional, technical and support staff and/or private consultants, estimates manpower needs, schedules and assigns work. Participates in personnel matters such as hiring, training, and performance reviews.
- Participates in drafting contracts and budget proposals, may participate in other fiscal activities. Drafts detailed and complex agreements.
- Participates as the advanced technical specialist in the development of plans, estimates and specifications for the construction of projects. Plans, coordinates and oversees program and project implementation.
- Participates in report writing and analyzing subordinates reports, inspects projects for compliance with state/federal rules and regulations and makes recommendations for corrective action.
- Recommends changes to departmental policies, procedures, and regulations.
- Contacts include planning, coordinating and conducting informative meetings and workshops with other agencies, the private sector, and the public.

Florida

Contact: Robert F. Quigley, State Project Management Engineer, Production Support Office, Florida DOT, 850-414-4356, robert.quigley@dot.state.fl.us.

See attached District Design Org Chart for various positions.

Related Resource:

FDOT District Design Office Organizational/Career Progression Chart, Florida DOT, August 2014.

See [Appendix F](#).

This chart reflects the possible classifications and career paths within sections of the average district design office.

Idaho

Contact: Tony Loomer, Training and Development Manager, Idaho Transportation Department (ITD), 208-334-8496, tony.loomer@itd.idaho.gov.

Note: An alphabetical listing of Idaho state job descriptions is available at <https://labor.idaho.gov/DHR/ATS/StateJobs/JobDescriptions.aspx>.

- Transportation Engineer (Civil).
Similar ITD positions: Technical Engineer 1 and 2.
- Senior Transportation Engineer.
Similar ITD positions: Engineer Manager 1, 2 and 3.
- Senior Bridge Engineer.
Similar ITD positions: None.
- Transportation Engineer (Electrical).
Similar ITD positions: None.
- Engineering Geologist.
Similar ITD positions: Geologist.

Maryland

Contact: William Barnard, Manager, Workforce Planning and Development, Office of Administration, Maryland State Highway Administration, 410-545-0337, bbarnard@sha.state.md.us.

Related Resource:

Transportation Engineering Job Classifications, Maryland State Highway Administration, 2008.

See [Appendix G](#).

Job classifications for the following engineering positions are provided in this document:

- Transportation Design Engineer I/II, III, IV, V, VI and VII.
- Transportation Engineer I, II, III, IV and V.
- Transportation Engineer Manager I/II.

Missouri

Contact: Cherrie Parker, Senior Human Resources Specialist, Missouri DOT, 573-526-4551, pamela.parker@modot.mo.gov.

Here is a link to MoDOT's job descriptions. Individual job titles are listed below.
<https://www6.modot.mo.gov/HRIS/external/jobDescriptInternet.do>

- **Transportation Engineer (Civil).**
Similar Missouri DOT positions: Highway Designer, Intermediate Highway Designer, Senior Highway Designer, Construction Inspector, Interm. Construction Inspector, Sr. Constr. Inspector, Materials Inspector, Int. Materials Inspector, Sr. Materials Inspector, Structural Designer, Int. Structural Designer, Sr. Structural Designer, Traffic Studies Specialist, Int. Traffic Studies Spec., Sr. Traffic Studies Spec., Project Reviewer, Int. Project Reviewer, Sr. Project Reviewer, Pavement Specialist, Int. Pavement Specialist, Sr. Pavement Specialist, Project Development Specialist, Int. Project Dev. Spec., Sr. Project Dev. Spec.
- **Senior Transportation Engineer.**
Similar Missouri DOT positions: Resident Engineer.
- **Senior Bridge Engineer.**
Similar Missouri DOT positions: District Bridge Engineer.
- **Transportation Engineer (Electrical).**
Similar Missouri DOT positions: N/A.
- **Engineering Geologist.**
Similar Missouri DOT positions: Geotechnical Specialist, Int. Geotechnical Spec., Sr. Geotechnical Specialist.

Nebraska

Contact: Carrie Williams, Human Resources Manager, Nebraska Department of Roads (DOR), 402-479-4870, carrie.williams@nebraska.gov.

Note: An alphabetical listing of Nebraska state job specifications is available at <http://das.nebraska.gov/personnel/classncomp/jobspecs/>.

- **Transportation Engineer (Civil).**
Similar Nebraska DOR positions: Engineer II.
- **Senior Transportation Engineer.**
Similar Nebraska DOR positions: Engineer III.
- **Senior Bridge Engineer.**
Similar Nebraska DOR positions: Engineer III.

- **Transportation Engineer (Electrical).**
Similar Nebraska DOR positions: N/A.
- **Engineering Geologist.**
Similar Nebraska DOR positions: N/A.

New Hampshire

Contact: Paula Nash, Workforce Development Manager, New Hampshire DOT, 603-271-8025, pnash@dot.state.nh.us.

We have several classifications for the State of NH. You can find out the qualifications, education, work experience and additional information at this web site: <http://das.nh.gov/hr/comp.html>. Positions that you can review include Civil Engineer I-VII, Engineering Aide I and II, Engineering Tech I – V and Senior Engineer.

New Jersey

Contact: Patrick Vannozzi, Administrative Analyst 1, Division of Human Resources, Office of Employee Operations, New Jersey DOT, 609-530-4942, patrick.vannozzi@dot.nj.gov.

I have attached an Excel Spreadsheet list[ing] all the engineering title[s] we currently utilize here at the NJDOT, along with a URL to our Civil Service Commission Site. By entering the title code you will have access to the full job specification for any of the job titles.

This is a URL to our Civil Service Commission site where you will be able to view the full job specification for those titles: <http://info.csc.state.nj.us/TitleList/TitleSearch.aspx>.

Related Resource:

Engineering Job Titles, New Jersey DOT, undated.

See [Appendix N](#).

Use this list of engineering job titles in conjunction with the URL provided above to view job descriptions for relevant positions.

New York

Contact: Raymond LaMarco, Director, Human Resources Management, New York State DOT, 518-457-3543, raymond.lamarco@dot.ny.gov.

Note: Use the following link to conduct a title search, using the titles below, for information about New York State DOT positions, including the title's salary grade, job description and qualifications, examination information (if applicable) and related career mobility options: <http://careermobilityoffice.cs.ny.gov/cmo/gotit/title-search/index.cfm>.

- Civil Engineer 2, 3, 4, 5 and 7. The Civil Engineer 2 through 7 requires a Professional Engineering (PE) license.

- Senior Land Surveyor. The Senior Land Surveyor requires a Land Surveying (LS) license.
- Senior Landscape Architect, Associate Landscape Architect. The Senior Landscape & Associate Landscape Architect requires a Registered Landscape Architect (RLA) license.

Virginia

Contact: William H. Danzeisen, Statewide Technical Training Manager, VDOT Learning Center, Virginia DOT, 804-786-4908, william.danzeisen@vdot.virginia.gov.

Note: Job descriptions for each of the Virginia DOT job titles listed below are provided in Related Resources.

- **Transportation Engineer (Civil).**

Similar Virginia DOT positions:

0577	Engineer Construction
0067	Engineer Hydraulics
0069	Engineer Land Use
0072	Engineer Materials
0076	Engineer Operations
0096	Engineer Roadway Design
0097	Engineer Structure & Bridge
1201	Engineer Structure & Bridge Inspection
0144	Engineer Traffic

- **Senior Transportation Engineer.**

Similar Virginia DOT positions:

0105	Engineer Sr Construction
0108	Engineer Sr Hydraulics
0110	Engineer Sr Land Use
0112	Engineer Sr Materials
0546	Engineer Sr Operations
0120	Engineer Sr Roadway Design
0126	Engineer Sr Traffic
0550	Engineer Sr Supervisor Construction
0551	Engineer Sr Supervisor Materials
1282	Engineer Sr Supervisor Operations
0554	Engineer Sr Supervisor Roadway Design
0557	Engineer Sr Supervisor Traffic

- **Senior Bridge Engineer.**

Similar Virginia DOT positions:

0121	Engineer Sr Structure & Bridge
0555	Engineer Sr Supervisor Structure & Bridge
0101	Engineer Section Manager Structure & Bridge

- **Transportation Engineer (Electrical).**
Similar Virginia DOT positions: None.
- **Engineering Geologist.**
Similar Virginia DOT positions:
 - 0066 Engineer Geotechnical
 - 0560 Engineer Supervisor Geotechnical
 - 0107 Engineer Senior Geotechnical

Related Resources:

Transportation Engineer Job Descriptions, Virginia DOT, 2014.

See [Appendix P](#).

This zip folder contains nine job descriptions for the transportation engineer job class.

Senior Transportation Engineer Job Descriptions, Virginia DOT, 2014.

See [Appendix Q](#).

This zip folder contains 12 job descriptions for the senior transportation engineer job class.

Senior Bridge Engineer Job Descriptions, Virginia DOT, 2014.

See [Appendix R](#).

This zip folder contains three job descriptions for the senior bridge engineer job class.

Geologist Job Descriptions, Virginia DOT, 2014.

See [Appendix S](#).

This zip folder contains three job descriptions for the geologist job class.

Washington

Contact: Jeff Carpenter, Director, Project Development Division, Washington State DOT, 360-705-7231, carpenj@wsdot.wa.gov.

Note: An alphabetical Classified Job Listings for Washington state job descriptions is available at <http://www.dop.wa.gov/CompClass/JobClassesSalaries/Pages/ClassifiedJobListing.aspx?FilterValue=A>.

- **Transportation Engineer (Civil).**
Similar Washington State DOT positions: Transportation Engineer 1/Transportation Engineer 2.
- **Senior Transportation Engineer.**
Similar Washington State DOT positions: Transportation Engineer 3 — Design Team Leader.
- **Senior Bridge Engineer.**
Similar Washington State DOT positions: Bridge Engineer 5.

- **Transportation Engineer (Electrical).**
Similar Washington State DOT positions: Electrical Engineer 3 (not a direct match to Caltrans).
- **Engineering Geologist.**
Similar Washington State DOT positions: Transportation Technical Engineer (Geotechnical).

Wisconsin

Contact: Lisa Piekarski, Human Resources Specialist, Bureau of Human Resource Services, Wisconsin DOT, 608-264-9529, lisa.piekarski@dot.wi.gov.

Civil Engineer Transportation (entry level)

These are our entry level positions where the incumbent spends time learning WisDOT's processes and procedures, provides support to higher level engineers, and works under close supervision. Applicants typically are new graduates or have up to 3 years of professional level engineering experience. These titles have a variety of specialized focus areas such as geotechnical, project development, design and construction, environmental, materials, highway maintenance, estimating, traffic.

Civil Engineer Transportation Senior

Incumbent has the ability to make independent decisions regarding transportation projects and function as a program or project leader on a transportation project. Applicants possess at least 4 years of professional engineering experience, or incumbents enter at the entry level and reclassify to the Senior level after 3-4 years of WisDOT work experience. These titles have a variety of specialized focus areas such as geotechnical, project development, design and construction, environmental, materials, highway maintenance, estimating, traffic.

Civil Engineer Transportation Advanced

Incumbents provide technical engineering expertise in their assigned program area and act as transportation project managers and complete all aspects of a transportation project. Applicants are required to possess a Professional Engineer (PE) license upon application. These titles have a variety of specialized focus areas such as geotechnical, project development, design and construction, environmental, materials, highway maintenance, estimating, traffic. At this level the incumbent becomes the "technical expert" in their area of expertise for the entire state or their geographical location.

**This document describes all levels of the Civil Engineer Transportation titles at DOT and describes in more detail the different "focus areas" a Civil Engineer Transportation could work in: <http://oser.state.wi.us/docview.asp?docid=2962>.

Civil Engineer Transportation Supervisor

Incumbents provide oversight and management to professional engineering staff who are responsible for the planning, design, development, construction operation and maintenance of transportation facilities. Applicants must compete for these positions and applicants are required to possess a Professional Engineer (PE) license upon application.

**This document describes the Civil Engineer Transportation Supervisor title at DOT:
<http://oser.state.wi.us/docview.asp?docid=2965>.

Structural Engineer Transportation (entry level)

These are our entry level positions where the incumbent spends time learning WisDOT's processes and procedures, provides support to higher level engineers, and works under close supervision. Applicants typically are new graduates or have up to 3 years of professional level engineering experience. These titles focus specifically on structural engineering including areas such as design, bridge maintenance, metals and fabrication, hydraulics and bridge inspection/repair.

Structural Engineer Transportation Senior

Incumbent has the ability to make independent decisions regarding transportation projects and function as a program or project leader on a transportation project. Applicants possess at least 4 years of professional engineering experience, or incumbents enter at the entry level and reclassify to the Senior level after 3-4 years of WisDOT work experience. These titles continue to focus on their structural engineering specialized area.

Structural Engineer Transportation Advanced

Incumbents provide technical engineering expertise in their assigned structural engineering program area and act as transportation project manager and complete all aspects of a transportation project. Applicants are required to possess a Professional Engineer (PE) license upon application or incumbents can reclassify from the Senior to the Advanced level after about 2-4 years of WisDOT experience at the Senior level. At this level the incumbent becomes the "technical expert" in their area of expertise for the entire state.

**This document describes all levels of the Structural Engineer Transportation titles at DOT and describes in more detail the different "focus areas" a Structural Engineer Transportation could work in: <http://oser.state.wi.us/docview.asp?docid=7631>.

Structural Engineer Transportation Supervisor

Incumbents provide oversight and management to professional engineering staff who are responsible for the planning, design, development, construction operation and maintenance of transportation facilities. Applicants must compete for these positions and applicants are required to possess a Professional Engineer (PE) license upon application.

**This document describes the Structural Engineer Transportation Supervisor title at DOT:
<http://oser.state.wi.us/docview.asp?docid=7632>.

Appendix B: Survey Results (Questions 2 through 12)

The full text of each survey response is provided below for survey questions 2 through 12. (See [Appendix A](#) for responses to survey question 1.) For reference, we have included an abbreviated version of each question before the response; for the full question text, please see page 6 of this Preliminary Investigation.

Alaska

Contact: Shelly M. Saviers, Human Resource Consultant, Alaska DOT and Public Facilities (DOT&PF), 907-465-8124, shelly.saviers@alaska.gov.

1. **Engineering job classifications:** [See [Appendix A](#).]
2. **Continuing education requirements for each job classification:** Require incumbent to maintain a current Professional Engineer license for the Engineer/Architect and Technical Engineer classifications.
- 2a. **Require professional development units for each classification?** No.
3. **Offer elective educational opportunities?** Yes.
- 3a. **Types of classes offered:** [Training Calendar for Research, Development & Technology Transfer](#). Other classes are offered by our department on request:

Classes Available to Alaska DOT&PF employees only:

- Generations on the Move (Understanding and Leading Multi-Generational Teams)
- Peer to Supervisor (How to be Successful in Making the Transition)
- “We have to Start Meeting Like This” (Streamlining and Making Meetings Matter)
- Introduction to Conflict Resolution (Learn 7 step process to resolve interpersonal conflicts)
- Applied Conflict Resolution (Prerequisite: Introduction to Conflict Resolution)
- Communications

Additional training is Leadership Development Program. For this training, participants were chosen based on their performance on the job, current leadership skill levels, and availability to fully commit to the entire program. LDP is designed to improve communication and interaction skills, build trust and teamwork within and between regions and divisions, and develop key leadership skills to improve employee engagement across the department.

Participant commitment level includes attending a total of 3 workshops, approximately one month apart, and participating in brief strength-building exercises. The workshops cover topics such as situational leadership, psychological capital, leadership under pressure, and change management. Between the workshops, there are individual virtual consults with an expert-level performance coach to review leadership development plans and discuss application of learned material. In addition, individuals participate on peer learning teams and perform pre and post work including assessments, readings and exercises.

State of Alaska also offers training available to all employees of the State of Alaska. This is through LearnAlaska (<http://doa.alaska.gov/dof/learnalaska/>). Course Schedule can be found here: <http://doa.alaska.gov/dof/learnalaska/sections.xsl>.

- 3b. **Class offerings vary by job classification?** No.
- 3c. **Incentives for participation in elective training?** No monetary incentives.

- Opportunity to improve.
 - Credit on State of Alaska transcript.
 - Certificates of completion.
4. **Support employee participation in external training?** There are only community colleges in Barrow, Kodiak, Soldotna, Homer, Seward, Palmer and Valdez. None in Anchorage, Juneau or Fairbanks. There are three universities in Alaska (Anchorage, Juneau, Fairbanks). No massive online courses, but individuals can take college courses through proper supervisor chain of command.
 - 4a. **Level of employee participation in external training:** Based on job classes and continuing education.
 - 4b. **Pay for employee participation in external training?** Please see attached policy and procedure. [See [Appendix C.](#)]
 5. **Programs or practices to train and develop engineering staff:**
 - Organizational support for completion of advanced degree:** Up to individual.
 - Communities of practice:** No.
 - Cross-training:** Yes.
 - Job rotation:** No.
 - Leadership programs:** Yes, see above.
 - Mentoring/coaching:** Yes, informally.
 6. **Modes of instruction used most often in internal training:** Workshop, seminar, independent self-study.
 - 7a. **Who developed agency's online training?** [No response.]
 - 7b. **Examples of online courses.** Online training: Asbestos, Wetlands, Stormwater & Hazard Communication.
 - 7c. **Percentage of all training that is presented online:** Unknown.
 8. **Who delivers instruction?** A mix of employees and consultants.
 9. **Catalog of educational opportunities?** See above.
 10. **Successes in providing or supporting training:** Provided promotional opportunities.
 11. **Challenges in providing or supporting training:** Geographical challenges.
 12. **Other comments:** [No response.]

Related Document:

Training, Policy and Procedure No. 02.04.010, Alaska DOT & Public Facilities, March 2013. See [Appendix C.](#)

This document provides guidelines for employee participation in training.

Arkansas

Contact: Carla Edwards, Personnel Staff Coordinator, Arkansas State Highway & Transportation Department, 501-569-2431, carla.edwards@ahtd.ar.gov.

1. **Engineering job classifications:** [See [Appendix A.](#)]
2. **Continuing education requirements for each job classification:** [No response.]
- 2a. **Require professional development units for each classification?** The Department doesn't specifically require hours; however, the professional boards for engineers and geologists require a certain amount of continuing education hours.
3. **Offer elective educational opportunities?** [Yes.]
- 3a. **Types of classes offered:** NHI [National Highway Institute, the training and education arm of Federal Highway Administration], TRB, classes dealing with specific topics such as concrete, bridge design, etc.
- 3b. **Class offerings vary by job classification?** Normally any engineer can participate, but some offerings are geared more towards a specific area such as construction or bridge design.
- 3c. **Incentives for participation in elective training?** No.
4. **Support employee participation in external training?** Depends on the nature and timing of course. The Department would not support any employee taking a university course unless it was on his/her own time, or the timing of the class did not disrupt work production and the employee was able to flex the work week to make up the time. The Department does not pay for continuing education of that manner.
- 4a. **Level of employee participation in external training:** Not significant.
- 4b. **Pay for employee participation in external training?** Yes, if it is a specific training from which the employee would benefit and the supervisor has instructed the employee to attend.
5. **Programs or practices to train and develop engineering staff:** None of the practices are formally used.
6. **Modes of instruction used most often in internal training:** Most often our classes are lecture, workshop or seminar.
- 7a. **Who developed agency's online training?** Online training is not offered at this time.
- 7b. **Examples of online courses:** N/A.
- 7c. **Percentage of all training that is presented online:** N/A.
8. **Who delivers instruction?** Mix of [employees and consultants], but mainly an outside source.
9. **Catalog of educational opportunities?** No catalog. Sampling of course descriptions: Asphalt Symposium, Erosion Control, Transportation Research, Concrete Pavement, Bridge Inspection, Miscellaneous NHI.
10. **Successes in providing or supporting training:** This is very helpful to our staff. Normally, the Department hosts enough classes that professional engineers do not have to seek outside classes for continuing professional development hours.

11. **Challenges in providing or supporting training:** [No response.]
12. **Other comments:** [No response.]

Delaware

Contact: Shanté A. Hastings, Deputy Director, Transportation Solutions, Delaware DOT, 302-760-2835, shante.hastings@state.de.us.

1. **Engineering job classifications:** [See [Appendix A.](#)]
2. **Continuing education requirements for each job classification:** [No.]
- 2a. **Require professional development units for each classification?** We do not require PDUs [professional development units] for each classification. In order to be promoted within the Engineer I-IV career ladder, incumbents must demonstrate proficiency of the job requirements. The Engineer V and Civil Engineer Program Manager are not part of the career ladder. Instead, employees must interview competitively for the position when a vacancy exists. Employees must have their Professional Engineering license to obtain an Engineer IV, V or Civil Engineer Program Manager I position. PDUs are required to maintain a Delaware PE license.
3. **Offer elective educational opportunities?** [Yes.]
- 3a. **Types of classes offered:** We provide training to our engineers through our T2 Center with the University of Delaware. We offer NHI courses, design training and other professional development courses. Typically, any of our engineers can attend the training, and we do not offer incentives to participate.
- 3b. **Class offerings vary by job classification?** [No.]
- 3c. **Incentives for participation in elective training?** [No.]
4. **Support employee participation in external training?** As of March 2015, we stopped offering educational assistance due to budgetary constraints. Educational assistance was utilized for college courses and the PE exam review course.
- 4a. **Level of employee participation in external training:** Approximately 2% of employees took advantage of the educational assistance program when it had funding.
- 4b. **Pay for employee participation in external training?** Approximately \$5,000 per employee was available.
5. **Programs or practices to train and develop engineering staff:**
 - Cross-training:** Cross-training is available within the department, but it is not utilized by our engineering staff. Employees can cross-train for three to six months in a position that is one level above their existing position.
 - Leadership programs:** DelDOT began an annual Leadership Academy in 2014. It's a five-week program that covers leadership topics, state government and DelDOT 101. One employee is selected from each division and many participants are non-engineers. Six of our engineers have graduated from the Academy.
 - Mentoring/coaching:** DelDOT is beginning a mentoring program this fall. We can provide additional information on the program next year.
 - Other practices or programs:** We also send up to six engineers to the AASHTO

National Transportation Management Conferences each year.

6. **Modes of instruction used most often in internal training:** Most often we utilize lectures/seminars or workshops for training.
- 7a. **Who developed agency's online training?** We do not currently offer online training for most training.
- 7b. **Examples of online courses:** Two that come to mind are provided through Bentley (MicroStation and InRoads) and Esri (ArcGIS).
- 7c. **Percentage of all training that is presented online:** We do not currently offer online training for most training.
8. **Who delivers instruction?** We use a mix of [employees and consultants], but mainly consultants.
9. **Catalog of educational opportunities?** We do not have a catalog, but I've listed some of the courses we've offered over the last few years below:

Year	Course Name	(hours)	Attendees
2011	Delaware MUTCD changes - Part 2 Signs	4.0	111
2011	DelDOT Winter Workshop	8.0	323
2011	DelDOT Materials and Research Training	6.0	110
2011	Delaware MUTCD changes - Part 6 Temporary Traffic Control	4.0	150
2011	Delaware MUTCD changes - Part 6 Temporary Traffic Control	4.0	104
2011	OSHA 10-hour Safety Training	7.0	30
2011	Delaware MUTCD changes - Part 3 Markings	4.0	137
2011	Delaware MUTCD changes - Parts 4 and 7	4.0	84
2011	Roadside Safety System Design Mentor and Guardrail Designer Training	8.0	119
2011	IPA Planning Course 209, "Planning Complete Streets in Delaware"	1.0	28
2011	Delaware MUTCD changes - Parts 8 & 9	4.0	72
2011	Warm Mix Asphalt Field Day	7.0	148
2011	Bridge Maintenance Training; FHWA-NHI-134029	28.0	20
2012	MUTCD for Locals: Intro, Part 1, Part 3	4.0	10
2012	MUTCD for Locals: Part 2	4.0	8
2012	MUTCD for Locals: Part 6	4.0	11
2012	Winter Maintenance: Snow and Ice Removal	7.0	7
2012	Winter Maintenance: Snow and Ice Removal	7.0	8
2012	EDC Exchange - Geosynthetic Reinforced Soil, Integrated Bridge System technology	3.0	18
2012	EDC Exchange - Geosynthetic Reinforced Soil, Integrated Bridge System technology	3.0	11
2012	DelDOT Winter Workshop	8.0	269

2012	DeIDOT Materials and Research Training	8.0	162
2012	MUTCD for Locals: Intro, Part 1, Part 3	4.0	15
2012	MUTCD for Locals: Part 2	4.0	14
2012	MUTCD for Locals: Part 6	4.0	19
2012	HSM Lite	4.0	7
2012	HSM Lite	4.0	27
2012	Practitioner's Workshop for the Highway Safety Manual	8.0	18
2012	Roadside Safety Design FHWA-NHI-380032A	24.0	30
2012	EDC Exchange - Flexibility in ROW	3.0	18
2012	EDC Exchange - In Lieu Fees/Mitigation Banking	3.0	-
2012	EDC Exchange - Adaptive Signal Control	3.0	-
2012	50 Ways to Lose Your Federal Funding	6.0	31
2013	Winter Workshop	7.0	291
2013	Materials and Research Workshop	7.0	261
2013	Delaware Recreation and Parks Society 33rd conference - double session on work zone safety during roadside maintenance activities	3.0	40
2013	Geosynthetic Reinforced Soil Integrated Bridge System (GRS-IBS) Showcase	4.5	45
2013	Highway Performance Monitoring Systems training	14.0	17
2013	Interactive Consultant Manager Training	7.0	8
2013	Interactive Consultant Manager Training	7.0	40
2013	Interactive Consultant Manager Training	7.0	24
2013	Construction Claims Avoidance training	14.0	35
2013	EDC 2 Spring Summit - STIC	2.0	10
2013	EDC 2 Spring Summit - Environmental	3.0	13
2013	EDC 2 Spring Summit - Operations	3.0	11
2013	EDC 2 Spring Summit - Safety	3.0	11
2013	EDC 2 SHRP 2 Peer Exchange	2.0	6
2013	OSHA 10-hour training/certification	10.0	16
2013	OSHA 10-hour training/certification	10.0	11
2014	NHI 130055, Safety Inspection of In-Service Bridges	80.0	34
2014	Materials and Operations Training	7.0	125
2014	Claims Avoidance Training	14.0	30
2014	Quality Section Winter Workshop	6.5	247
2014	EDC Exchange - Intelligent Compaction	2.0	6
2014	Delaware Concrete Pavement (SPS-2) Tech Day	4.0	22
2014	MUTCD, General, Parts 1 and 3	4.0	11
2014	MUTCD, General, Part 2	4.0	12
2014	MUTCD, General, Part 6	4.0	13

2014	Asphalt Best Construction Practices	4.0	18
2014	NHI 130055, Safety Inspection of In-Service Bridges	80.0	13
2014	EDC Exchange on High Friction Surfaces	2.0	-
2014	EDC Exchange - High Frequency Surface Treatments	2.0	4
2014	NHI 130055, Safety Inspection of In-Service Bridges	8.0	13
2014	Designing Pedestrian Facilities for Accessibility (DPFA)	7.0	38
2014	Designing Pedestrian Facilities for Accessibility (DPFA)	7.0	37
2014	Ethics in Engineering	2.5	20
2014	3D Engineered Models for Construction Workshop for The Delaware Department of Transportation	7.5	78
2014	Winter Maintenance Training Workshop	7.5	27
2014	Ethics in Engineering	3.0	21
2014	Ethics in Engineering	3.0	25
2014	Ethics in Engineering	3.0	23
2014	Ethics in Engineering	3.0	14
2015	Quality Section Winter Workshop	6.5	198
2015	CM/GC Workshop	6.0	30
2015	NHI Roadside Safety Design	18.0	30
2015	NHI LRFD	24.0	30

10. **Successes in providing or supporting training:** Training definitely improves morale, increases knowledge and prepares employees for career advancement.
11. **Challenges in providing or supporting training:** Funding has been the greatest challenge over the years.
12. **Other comments:** We would love to see the results/summary of this survey. Please forward information to shante.hastings@state.de.us.

Florida

Contact: Robert F. Quigley, State Project Management Engineer, Production Support Office, Florida DOT, 850-414-4356, robert.quigley@dot.state.fl.us.

1. **Engineering job classifications:** [See [Appendix A.](#)]
2. **Continuing education requirements for each job classification:** Various training may be required based on position. PE [professional engineer] positions require Professional Development Hours to maintain licensure. [See Professional Engineer Training Program web pages in 2a. below.]
 - 2a. **Require professional development units for each classification?** PE positions require Professional Development Hours to maintain licensure. Florida Board of Professional Engineers Board continuing education requirements:
<http://www.fbpe.org/index.php/continuing-education/continuing-education-ce-requirements>.
 3. **Offer elective educational opportunities?** Yes. See the Office of Design Training page: <http://www.dot.state.fl.us/officeofdesign/Training/>. FDOT also has a Professional Engineer Training Program:
<http://www.dot.state.fl.us/PerformanceManagement/SpecialPrograms.shtm> and <http://www.dot.state.fl.us/projectmanagementoffice/PETTraining/default.shtm>.
 - 3a. **Types of classes offered:** Various courses available for each discipline. Annual Design Training Expo provides a variety of course offerings:
<http://www.dot.state.fl.us/officeofdesign/training/DesignExpo/2015/>. Also, see the attached **Design Training Plan** for an example of planned training for this year. [See [Appendix D.](#)]
 - 3b. **Class offerings vary by job classification?** Yes.
 - 3c. **Incentives for participation in elective training?** There is no formal incentive; however, for approved courses, FDOT provides the courses or covers the expense of approved courses, and in most cases FDOT considers training as time worked.
4. **Support employee participation in external training?**
 - MOOCs:* In general, employees may be approved to attend training when job-related. This may include online training such as webinars or in-person training.
 - College:* State employees are allowed tuition waiver for 6 credits per semester (if space available). Attendance in college courses is not considered time worked.
 - Outside:* Yes, when job-related, outside training provider courses may be approved.
- 4a. **Level of employee participation in external training:** Varies by course and discipline/position.
- 4b. **Pay for employee participation in external training?** Yes, when job-related and if budget allows.
5. **Programs or practices to train and develop engineering staff:**
 - Organizational support for completion of advanced degree:** Schedule accommodations (but on employee's own time).
 - Communities of practice:** Not necessarily applicable for training; however, training may be a by-product of a community of practice (which have been used [by] task teams to develop guidance or improve practices).
 - Cross-training:** Yes.

Job rotation: Limited.

Leadership programs: Yes. Supervisor, Management and Leadership Academies.

<http://www.dot.state.fl.us/PerformanceManagement/Academies.shtm>

Mentoring/coaching: No formal program, but mentoring/coaching is supported.

Other practices or programs: Yes. Annual Design Training Expo and other annual conferences (discipline-specific).

6. **Modes of instruction used most often in internal training:** Various: Lectures, workshops, online/computer-based training, and conferences are used.
- 7a. **Who developed agency's online training?** Generally developed in-house; occasionally developed by or in conjunction with consultants.
- 7b. **Examples of online courses:**
 - PM [Project Management] Training:
<http://www.dot.state.fl.us/projectmanagementoffice/PMHandbook/default.shtm>
 - Design Training: <http://www.dot.state.fl.us/officeofdesign/Training/default.shtm>
 - CADD Training:
<http://www.dot.state.fl.us/ecso/downloads/webinars/Posted.shtm#loadSection>
 - Other Various:
<http://www.dot.state.fl.us/PerformanceManagement/SpecialPrograms.shtm>
- 7c. **Percentage of all training that is presented online:** Not really sure, but I would say approximately 50%.
8. **Who delivers instruction?** A mix of employees and consultants.
9. **Catalog of educational opportunities?** See attached **FDOT Training Catalog**. [See [Appendix E](#).]
10. **Successes in providing or supporting training:** PE Training Program, Design Expo.
11. **Challenges in providing or supporting training:** Having the resources available to develop or provide needed training.
12. **Other comments:** Additional FDOT Contacts and Resources:
 - Jacqui Morris - Design Training Coordinator, 850-414-4153,
jacqueline.morris@dot.state.fl.us
 - Office of Design - <http://www.dot.state.fl.us/officeofdesign/>
 - Organizational Development - <http://www.dot.state.fl.us/PerformanceManagement/>

Related Documents:

Office of Design Training Plan, Florida DOT, Fiscal Year 2015-2016.

See [Appendix D](#).

This document describes the training available to Florida DOT employees for the current fiscal year.

Training Catalog, Florida DOT, undated.

See [Appendix E](#).

This 38-page document provides a listing of classes available to Florida DOT employees organized by course ID.

Idaho

Contact: Tony Loomer, Training and Development Manager, Idaho Transportation Department, 208-334-8496, tony.loomer@itd.idaho.gov.

1. **Engineering job classifications:** [See [Appendix A.](#)]
2. **Continuing education requirements for each job classification:** [No response.]
- 2a. **Require professional development units for each classification?** No. Idaho Transportation Department does not make this requirement because the Professional Board of Engineers requires 30 hours of Professional Development during each renewal period.
3. **Offer elective educational opportunities?** No.
- 3a. **Types of classes offered:** [No response.]
- 3b. **Class offerings vary by job classification?** [No response.]
- 3c. **Incentives for participation in elective training?** [No response.]
4. **Support employee participation in external training?** Yes, for community college or university courses and other outside sources for educational opportunities.
- 4a. **Level of employee participation in external training:** Hit or miss. Employees who are interested take advantage of it.
- 4b. **Pay for employee participation in external training?** Yes.
5. **Programs or practices to train and develop engineering staff:**
 - Organizational support for completion of advanced degree:** Occasionally.
 - Communities of practice:** No.
 - Cross-training:** Occasionally.
 - Job rotation:** No.
 - Leadership programs:** Yes. We have a robust internal program that is designed to align with our strategic goals and our organizational culture.
 - Mentoring/coaching:** Planning to, but haven't started a formal program yet.
 - Other practices or programs:** Engineer-in-Training program for new engineers to earn their PE.
6. **Modes of instruction used most often in internal training:** Lecture, workshop, online, laboratory (NHI).
- 7a. **Who developed agency's online training?** Purchased off-the-shelf from NHI.
- 7b. **Examples of online courses:** [No response.]
- 7c. **Percentage of all training that is presented online:** [No response.]
8. **Who delivers instruction?** A mix of employees and consultants.
9. **Catalog of educational opportunities?** [No response.]
10. **Successes in providing or supporting training:** We are experiencing success with our leadership and organizational culture training.
11. **Challenges in providing or supporting training:** Funding.
12. **Other comments:** [No response.]

Maryland

Contact: William Barnard, Manager, Workforce Planning and Development, Office of Administration, Maryland State Highway Administration, 410-545-0337, bbarnard@sha.state.md.us.

1. **Engineering job classifications:** [See [Appendix A](#).]
2. **Continuing education requirements for each job classification:** Please see attachments (Position Descriptions). [See [Appendix G](#).]
- 2a. **Require professional development units for each classification?** Please see attachments (Position Descriptions). [See [Appendix G](#).]
3. **Offer elective educational opportunities?** Please see attachments (GETP Handbook [see [Appendix I](#)], TE curricula spreadsheet [see [Appendix J](#)] and SHA University Catalog [see [Appendix H](#)]).
 - 3a. **Types of classes offered:** See above.
 - 3b. **Class offerings vary by job classification?** See above.
 - 3c. **Incentives for participation in elective training?** See above.
4. **Support employee participation in external training?** Please see attachments (AEP/TR Program). [See [Appendix K](#).]
 - 4a. **Level of employee participation in external training:** See above.
 - 4b. **Pay for employee participation in external training?** See above.
5. **Programs or practices to train and develop engineering staff:** Would suggest a phone call if details and further discussion are warranted.
 - Organizational support for completion of advanced degree:** To some degree.
 - Communities of practice:** To some degree.
 - Cross-training:** To some degree.
 - Job rotation:** To some degree.
 - Leadership programs:** To some degree.
 - Mentoring/coaching:** To some degree.
6. **Modes of instruction used most often in internal training:** All, to some degree. Would suggest a phone call if details and further discussion are warranted.
 - 7a. **Who developed agency's online training?** We utilize Skillssoft, NHI and TCCC [Transportation Curriculum Coordination Council, a training partnership of Federal Highway Administration, state DOTs and the highway transportation industry] primarily for online. We do have some in-house produced.
 - 7b. **Examples of online courses:** Over 700 courses from Skillssoft, and approx. 80 from NHI and TCCC.
 - 7c. **Percentage of all training that is presented online:** Approximately 10%.
8. **Who delivers instruction?** Primarily consultants, though not exclusively.
9. **Catalog of educational opportunities?** Please see attachments (SHA University Catalog). [See [Appendix H](#).]

10. **Successes in providing or supporting training:** A key metric would be retention. We are in the process of instituting “competency-based” assessments. Would suggest a phone call if details and further discussion are warranted.
11. **Challenges in providing or supporting training:** Primarily balancing workload with training and development activities.
12. **Other comments:** [No response.]

Related Documents:

Transportation Engineering Job Classifications, Maryland State Highway Administration, January 1, 2008.

See [Appendix G](#).

Job classifications for the following engineering positions are provided in this document:

- Transportation Design Engineer I/II, III, IV, V, VI and VII.
- Transportation Engineer I, II, III, IV and V.
- Transportation Engineer Manager I/II.

Training and Development Catalog, Maryland State Highway Administration, 2015.

See [Appendix H](#).

This catalog includes instructions for professional development plans, training and development programs and courses, and online course descriptions.

Graduate Engineer Training Program Handbook, Maryland State Highway Administration, Class of 2018.

See [Appendix I](#).

This handbook describes the training program for graduate engineers, including the project development process, project meetings, rotational assignments and training courses.

Transportation Engineer Curricula, Maryland State Highway Administration, undated.

See [Appendix J](#).

This Excel spreadsheet lists, by classification, the courses required for each job class.

Advanced Education/Tuition Reimbursement Program, Organizational Development Division, Office of Administration, Maryland State Highway Administration, July 2007.

See [Appendix K](#).

From page 3 of the document:

- 1.1 Consistent with the Maryland Department of Transportation Tuition Reimbursement Policy, it is also the policy of the State Highway Administration (SHA) to provide its employees with tuition reimbursement for continuing education that is job-related or is part of a program that meets identified needs of the State Highway Administration.

Missouri

Contact: Cherrie Parker, Senior Human Resources Specialist, Missouri DOT, 573-526-4551, pamela.parker@modot.mo.gov.

1. **Engineering job classifications:** [See [Appendix A.](#)]
2. **Continuing education requirements for each job classification:** No, MoDOT does not require specific continuing education.
- 2a. **Require professional development units for each classification?** No.
3. **Offer elective educational opportunities?** Yes.
- 3a. **Types of classes offered:** Soft skills (leadership and time management, for example).
- 3b. **Class offerings vary by job classification?** No.
- 3c. **Incentives for participation in elective training?** No.
4. **Support employee participation in external training?** Yes; community college or university courses and other outside sources for educational opportunities.
- 4a. **Level of employee participation in external training:** Significant; many employees choose to continue their education for career advancement opportunities.
- 4b. **Pay for employee participation in external training?** MoDOT offers tuition assistance and reimburses for engineering-related training/testing as follows, per policy:
 - a. Reimbursements will be made for study or refresher courses as follows:
 - i. A. An employee who is pursuing a registered land surveyor certification, regardless of current job title or whether the employee is pursuing the certification, voluntarily or through a job requirement, must meet the education and experience requirements as defined by the Missouri Board of Architects, Professional Engineers, and Land Surveyors before taking the study or refresher course.
 - ii. B. For positions other than those requiring a professional engineer license, reimbursement for study or refresher courses will only be paid when the employee is in a position that requires certification/license on the job specification.
 - iii. C. A graduate engineer, regardless of current job title, may receive reimbursement for taking the professional engineer refresher or study course.
 - iv. D. An employee may, at the discretion of the district engineer/division leader/state engineer, be reimbursed for a study or refresher course taken in preparation for a department-required certification/license after the employee has completed the course and successfully passed the appropriate certification/license examination. The course should be the most cost-effective and practical option.
 - b. Continuing education units/professional development hours will be reimbursed as follows:
 - i. A. An employee who attends a course which is required to keep his/her certification/license up to date will be reimbursed for the cost of the course, provided the employee's job specification requires the certification/license and he/she successfully completed the course. Districts/divisions/offices are authorized to approve reimbursement of costs related to courses taken to keep

an employee's certifications/licenses up to date if not required by the employee's job specification. Reimbursement should be limited to certifications/licenses that are to the benefit of MoDOT and relate to the employee's job. The course should be the most cost-effective and practical option.

5. **Programs or practices to train and develop engineering staff:**

Organizational support for completion of advanced degree: Yes, through tuition assistance.

Communities of practice: Yes, through external professional organizations.

Cross-training: Yes, informally and formally through job rotation (see below).

Job rotation: Yes, we have a formalized rotational program called the Accelerated Professional Engineers Rotational Program (APEX).

Leadership programs: Yes, but these are not engineering-specific programs.

Mentoring/coaching: Yes.

6. **Modes of instruction used most often in internal training:** Most often, MoDOT relies on instructor-led, online and self-paced training, independent study, and seminars/conferences (internal and external).

7a. **Who developed agency's online training?** Off-the-shelf.

7b. **Examples of online courses:** Some examples of online training taken by MoDOT engineers in the past 3 years include: "A Manager's Guide to Understanding Generations X & Y," "Accountability that Works for You," project management courses, safety courses (such as Back Safety and Safe Lifting Practices), time management courses including work/life balance and stress awareness courses, ethics courses and many more.

7c. **Percentage of all training that is presented online:** If referring to internally offered training only, estimate 60-75%.

8. **Who delivers instruction?** A mix of employees and consultants.

9. **Catalog of educational opportunities?** Attaching a catalog of all online classes offered to all MoDOT employees (not engineer-specific). [See [Appendix L](#).]

10. **Successes in providing or supporting training:** Statewide adoption of the APEX program took place in 2015. Prior to that, the program was piloted in the St. Louis district with great success (anecdotally measured through participant and supervisor satisfaction survey results), particularly in the areas of networking, organizational awareness and business acumen. Also this year, MoDOT was able to implement a new learning management system (called MoDOT U), which allows our employees on-demand access to up-to-date online courses in a wide variety of subject matter. MoDOT also has successful CE [continuing education] recruiting and internship programs.

11. **Challenges in providing or supporting training:** Insufficient funding, limited training resources (people) for providing training opportunities, turnover.

12. **Other comments:** [No response.]

Related Document:

Active Online Courses, Missouri DOT, undated.

See [Appendix L](#).

This spreadsheet lists all online courses available to all Missouri DOT employees.

Nebraska

Contact: Carrie Williams, Human Resources Manager, Nebraska Department of Roads, 402-479-4870, carrie.williams@nebraska.gov.

1. **Engineering job classifications:** [See [Appendix A.](#)]
2. **Continuing education requirements for each job classification:** We will occasionally provide opportunities for individuals to receive CEUs [continuing education units] by scheduling presentations/speakers on various topics. Also, many conferences are available to engineers, and others, which will provide CEUs. Otherwise engineers have the responsibility to acquire and maintain their own training for continued certification.
 - 2a. **Require professional development units for each classification?** No, we do not require specifics by classification.
3. **Offer elective educational opportunities?** Our training program provides a variety of general soft-skill courses that are open to all staff. Engineering staff wishing to receive PDU credit are asked to maintain their own record of attendance, and hours, and submit to the Board of Engineers for approval.
 - 3a. **Types of classes offered:** [No response.]
 - 3b. **Class offerings vary by job classification?** [No response.]
 - 3c. **Incentives for participation in elective training?** No.
4. **Support employee participation in external training?** We do not provide these opportunities.
 - 4a. **Level of employee participation in external training:** [No response.]
 - 4b. **Pay for employee participation in external training?** If people locate and request to attend, the department has a budget allowing for this expense.
5. **Programs or practices to train and develop engineering staff:**
 - Organizational support for completion of advanced degree:** We offer a tuition assistance program to aid employees.
 - Communities of practice:** Informal only.
 - Cross-training:** Informal only.
 - Job rotation:** Informal only, occasionally involving a District Engineer moving into a Division position for a short time period.
 - Leadership programs:** Yes.
 - Mentoring/coaching:** Informal program.
6. **Modes of instruction used most often in internal training:** The majority of our internal course offerings are done through the traditional classroom setting. We do offer a variety of online courses through our LMS [learning management system], using Lynda.com.
 - 7a. **Who developed agency's online training?** While we have a few in-house course offerings, most of our online training is provided by Lynda.com, contracted through our State Department of Administrative Services.
 - 7b. **Examples of online courses:** [No response.]
 - 7c. **Percentage of all training that is presented online:** 25%.

8. **Who delivers instruction?** We have a team of internal trainers we use for most soft-skill training. Courses requiring technical or engineering experience are usually consultants or outside vendors. We also work with LTAP [the Local Technical Assistance Program].
9. **Catalog of educational opportunities?** Catalog is included. [See [Appendix M.](#)]
10. **Successes in providing or supporting training:** [No response.]
11. **Challenges in providing or supporting training:** The knowledge of the engineering staff is quite specific. On occasion we may have difficulty locating the proper training, or being able to afford the cost associated with the training.
12. **Other comments:** [No response.]

Related Document:

Workforce Development Training Catalog, Human Resources Workforce Development, Nebraska Department of Roads, October 2014.

See [Appendix M.](#)

This catalog includes the required courses for new employees, course descriptions, details of special training programs such as the Leadership Development Program, and job-specific and technical training.

New Hampshire

Contact: Paula Nash, Workforce Development Manager, New Hampshire DOT, 603-271-8025, pnash@dot.state.nh.us.

The survey respondent provided the following in lieu of completing the survey:

Answers for questions 2-12. We provide a variety of NHI classes that individuals can attend. These classes can be used to help meet CEUs to maintain PE status.

New Jersey

Contact: Patrick Vannozi, Administrative Analyst 1, Division of Human Resources, Office of Employee Operations, New Jersey DOT, 609-530-4942, patrick.vannozi@dot.nj.gov.

1. **Engineering job classifications:** [See [Appendix A.](#)]
2. **Continuing education requirements for each job classification:** There are no continuing education requirements based on job title(s). The SNJ's [State of New Jersey's] Civil Service Commission maintains job classifications and [is] the only body that can add requirements, even at our request.
 - 2a. **Require professional development units for each classification?** No units per se, however, based on job responsibilities there may be required training the individual needs to attend.
3. **Offer elective educational opportunities?** Yes, through various methods.
 - 3a. **Types of classes offered:** Various hard and soft skills and some technical training.
 - 3b. **Class offerings vary by job classification?** No, they would be open to all with management approval.

- 3c. **Incentives for participation in elective training?** No, there are no incentives.
4. **Support employee participation in external training?** For online-only based on the applicability of the program. Yes, we do support for college credit through our Tuition Aid program; we endeavor to try and grow our own. The object is to have individuals qualify for positions that may require a degree.
- 4a. **Level of employee participation in external training:** We have in excess of 300 employees enrolled in our Career Development/Tuition Aid program for a total employee base of 3,500.
- 4b. **Pay for employee participation in external training?** Yes, through direct reimbursement upon successful completion of the training program.
5. **Programs or practices to train and develop engineering staff:**
- Organizational support for completion of advanced degree:** Yes, via our Tuition Aid program.
 - Communities of practice:** No.
 - Cross-training:** On a very limited basis.
 - Job rotation:** No.
 - Leadership programs:** Yes, at entry-level supervision up to higher-level management. We utilize the Certified Public Manager (CPM) course of study through Rutgers University.
 - Mentoring/coaching:** Not at this time.
6. **Modes of instruction used most often in internal training:** Online, lecture, laboratory, workshop, seminar, independent study, self-paced, but principally instructor-led training, with a lesser online training or blended method.
- 7a. **Who developed agency's online training?** Mostly off-the-shelf; however, we have developed some OLT [online training] courses, but mostly on in-house administrative practices.
- 7b. **Examples of online courses:** Various NHI courses, webinars and some technical training. Very broad based.
- 7c. **Percentage of all training that is presented online:** Only 5-8% of our training is done online.
8. **Who delivers instruction?** We will utilize our own SMEs [subject matter experts] when possible, but most of our training delivery is with contracted vendors.
9. **Catalog of educational opportunities?** Unfortunately, it is housed in our Learning Management System, which I am unable to share.
10. **Successes in providing or supporting training:** For the most part we have been very successful delivering training programs to our staff. As you [are] aware the DOTs are a very training-intensive environment, encompassing all areas of technical engineering training to basic field training to our maintenance staff.
11. **Challenges in providing or supporting training:** SNJ's procurement processes often make purchasing and delivery difficult, but our biggest issues are trying to deliver programs as quickly and efficiently as possible.

12. **Other comments:** For a more detailed explanation, please feel free to call me to go over any of these questions and the details; I can be reached at 609-530-4942 from 7-4 EST Monday-Friday.

New York

Contact: Raymond LaMarco, Director, Human Resources Management, New York State DOT, 518-457-3543, raymond.lamarco@dot.ny.gov.

1. **Engineering job classifications:** [See [Appendix A.](#)]
2. **Continuing education requirements for each job classification:**
 - The Civil Engineer 2 through 7 requires a Professional Engineering (PE) license.
 - The Senior Land Surveyor requires a Land Surveying (LS) license.
 - The Senior Landscape & Associate Landscape Architect requires a Registered Landscape Architect (RLA) license.

CE Coordination in NYSDOT:

NYSDOT is a Continuing Education Sponsor Organization of The Practicing Institute of Engineering Inc. (PIE). PIE is an organization that provides accreditation for Continuing Education in New York State. Sponsor Organizations are organization members of PIE (as defined in the Bylaws) that are capable of creating and maintaining a self-sufficient CE program. NYSDOT approves its own internal qualified training and maintains all related records. NYSDOT CE procedures, program and records are subject to audit by PIE. NYSDOT conducts CE in a manner consistent with New York State Education Department (NYSED) regulations and PIE procedures. NYSDOT provides CE opportunities to its employees, and promotes peer-to-peer training to the greatest extent practical.

The Office of Design (Engineering Division) administers the procedures for program areas to apply for Professional Development Hours (PDHs) for NYSDOT-sponsored programs. NYSDOT program areas sponsoring a program or event that may qualify for PDH credits applicable to licensed Professional Engineers (PE), Landscape Architects (LA) and Land Surveyors (LS) should submit requests as directed on the Program Submittal Form & Instructions. CE coordination is also performed by the Office of Design. The CE Coordinator is the official liaison with PIE and is responsible for overseeing the CE activities in NYSDOT.

On average, NYSDOT reviews and approves 30-40 training events that qualify for PDH [professional development hour] credits. Training events include formal classroom training, lectures, webinars and hands-on training. In 2014, we issued 1,600 certificates.

- 2a. **Require professional development units for each classification?** This is mandated by the New York State Education Department (NYSED). Every NYS licensed and registered engineer and land surveyor must complete continuing education. Professional Engineers and registered landscape architects require 36 hours of continuing education during each 3-year registration period. Land surveyors are required to complete 24 hours of continuing education during each 3-year registration period. Each licensee must take continuing education in appropriate subject areas offered by approved sponsors. For more information on professional development hours (PDHs) and appropriate subject areas, please visit the [NYSED web site](#).

3. **Offer elective educational opportunities?** [Yes.]
 - 3a. **Types of classes offered:** We offer RedVector licenses to our engineering staff (mostly designers). We currently have 50 participants. RedVector offers hundreds of online training modules. Most of them have already been approved for PDH credits.
 - 3b. **Class offerings vary by job classification?** [No response.]
 - 3c. **Incentives for participation in elective training?** [No response.]
4. **Support employee participation in external training?** [No response.]
 - 4a. **Level of employee participation in external training:** Minimal.
 - 4b. **Pay for employee participation in external training?** NYSDOT is a participating agency for Advanced Institute for Transportation Education (AITE) scholarships. Scholarships are awarded by the UTRC2 [University Transportation Research Center; see <http://www.utrc2.org/>] for up to (2) years of study towards an advanced degree in transportation at a participating university; actual value in tuition support, \$25,000. Our agency 'matches' the scholarship by allowing (500) hours of paid release time to complete studies. This program may have (1) or (2) candidates per year.
5. **Programs or practices to train and develop engineering staff:**
 - Organizational support for completion of advanced degree:** AITE scholarship; see 4b. above.
 - Job rotation:** Provide rotation program for entry-level engineers on a limited basis.
 - Leadership programs:** Leadership Academies. Since 2010 the agency has had (2) Leadership Academies. Each Academy is delivered off-site and involves (14) days of training spread out over (1) year. Training is provided by published experts in their respective fields, includes a panel of Commissioners of Transportation from neighboring states, includes a panel of control agency representatives, and requires a leadership 'project' for graduation. Each Academy trains up to (50) cross-discipline participants. The agency is currently planning another Academy for 2016 or 2017. This Academy will be jointly conducted with a partner agency, Department of Environmental Conservation, and will train up to (25) NYSDOT participants.
 - Mentoring/coaching:** NYSDOT does have a formal mentoring program that has minimal participation (2-3 new applicants per year). This program directly involves the agency in selection of a suitable mentor for an employee upon request. Informal mentoring is very active. Informal mentoring involves self-initiated establishment of a mentoring relationship. It is estimated that 50% of new employees are involved in an informal mentoring relationship within their first year of joining NYSDOT.
6. **Modes of instruction used most often in internal training:** Formal instructor-led training (ILT) is the most common mode of training. We are also taking advantage of webinar technology to deliver shorter training classes (mostly 1 hour in duration). NYSDOT uses WebEx.
 - 7a. **Who developed agency's online training?** A combination of in-house developed and consultant developed.
 - 7b. **Examples of online courses:**
 - Introduction to the Project Development Process (developed in-house).
 - Technical Writing (four modules developed by consultant – RedVector).
 - Roadside Design Training Modules (developed in-house using Adobe Captivate).

MicroStation (CADD) online tutorials (developed in-house using Adobe Captivate).

- 7c. **Percentage of all training that is presented online:** Including the above examples and other mandatory training that is currently available online, I'd say 30%.
8. **Who delivers instruction?** We use a mix of both, but the majority of training is delivered by subject matter experts from NYSDOT.
9. **Catalog of educational opportunities?** All of our training classes are accessible via the statewide learning management system (SLMS).
The agency does an annual purchase of online learning licenses called the Empire Knowledge Bank. These licenses are inexpensive (\$23.04) and are available to employees on request. A list of course titles is available [here](#). The library we have access to is Professional Development & Business.
10. **Successes in providing or supporting training:** The Introduction to the Project Development Process was a success. We had several compliments from folks who don't work directly in project development and project delivery (for example, Real Estate, Traffic Operations, Purchasing, etc). After taking this introductory course, they had a better understanding of the overall project development process, from initiation through construction.
I believe the NYSDOT Leadership Academy was also a success. Our agency is geographically divided into (11) distinct regions and MO [main office]. The Academy took the best leadership candidates from each geographic area and created a cohort. These cohorts are now functioning much like a community of practice and are a candidate pool for well prepared leaders to meet the succession planning needs of NYSDOT for several years.
11. **Challenges in providing or supporting training:** Lack of funding; accelerated schedules, and shrinking workforce.
12. **Other comments:** [No response.]

Virginia

Contact: William H. Danzeisen, Statewide Technical Training Manager, VDOT Learning Center, Virginia DOT, 804-786-4908, william.danzeisen@vdot.virginia.gov.

1. **Engineering job classifications:** [See [Appendix A](#).]
2. **Continuing education requirements for each job classification:** The Virginia Department of Transportation (VDOT) does not require specific continuing education hours (CEUs) or professional development hours (PDHs) by job classification. The Virginia Department of Professional & Occupational Regulation (DPOR) requires 16 CEUs at each biannual relicensing. These hours can be obtained across the spectrum of engineering and managerial responsibilities.

Divisions or districts may conduct specific training targeted to engineering focus areas or project requirements, but this training is typically "just-in-time training" and while the CEUs can be used to fulfill relicensing requirements, the training is not consistently aligned with broader job classification nor is it regularly delivered.
- 2a. **Require professional development units for each classification?** No.
3. **Offer elective educational opportunities?** VDOT supports the pursuit of elective educational opportunities for all employees to include our engineering staff. VDOT engineer

participation in any of these courses is fully funded including travel when approved for attendance. Multiple other sources are also leveraged to meet continuing education hours including ASCE webinars and online sources such as RedVector.

3a. **Types of classes offered:** Sources of elective training include Federal Highway, University of Virginia Transportation Training Academy (UVA TTA) [see <http://www.cts.virginia.edu/tta-director-message/>], and AASHTO Transportation Curriculum Coordination Council (TC3) courses. UVA TTA offers a catalogue of programs to VDOT engineers at reduced rates in subjects ranging from Work Zone Safety to Pavement Design. A course [catalog](#) is provided.

3b. **Class offerings vary by job classification?** See 3. above.

3c. **Incentives for participation in elective training?** See 3. above.

4. **Support employee participation in external training?** The VDOT Learning Center does not currently advocate for participation in MOOCs. We do endorse participation in community college and university coursework related to VDOT work.

4a. **Level of employee participation in external training:** [No response.]

4b. **Pay for employee participation in external training?** For those enrolled in approved degree programs the department will pay up to \$5,250 per year in tuition assistance provided that “C” (undergraduate) or “B” (graduate) grades are achieved in the approved courses.

5. **Programs or practices to train and develop engineering staff:**

Organizational support for completion of advanced degree: VDOT supports job-related advanced degrees to the same level as outlined above (up to \$5,250 per annum).

Communities of practice: Department employees participate in a variety of communities of practice, both intra- and interagency.

Cross-training: The support of cross-training is left up to operational leaders at all level[s] of the organization.

Job rotation: See Core Development Program described below.

Leadership programs: The department currently conducts a three-tiered leadership development program. The Leadership Development Program for Teammates (LDP-T) is intended for frontline employees not currently supervising subordinates and is conducted one day a week for 10 weeks. The Leadership Development Program for Supervisors (LDP-S) is a 10-month course intended for new frontline supervisors and includes both classroom and online courses and culminates with a two-day capstone event that allows participants to synthesize the learning. Finally, VDOT’s Leadership Enhancement and Development Program (LEAD) is intended for mid- to senior-level managers, and features classroom work, peer coaching, learning circles and job exchanges.

Mentoring/coaching: In May of 2015, VDOT launched a department-wide career development program intended to prepare employees for hard-to-fill positions. The intent is to leverage coursework, job shadowing, acting positions, coaching and mentoring to prepare employees for critical engineering positions within the department.

Other practices or programs: VDOT’s primary pipeline program is the Core Development Program (CDP) which inducts a number of newly graduated engineers each year (19 for 2016) into a two-year development program intended to thoroughly prepare new employees for roles as assistant resident engineers, Construction Managers and other critical roles. Job rotations and cross-training are highlighted as our

associates are exposed to a wide variety of developmental opportunities. As a precursor to the CDP role, VDOT recruits, employs in the summer and provide[s] stipends to 12 new Engineer Scholars in 2016. The expectation is that they will be rolled into the CDP program following their graduation. In addition the department annually recruits a number of interns (33 in 2016) who are current college students (undergrad and graduate) to work the summer months in business and engineering positions.

6. **Modes of instruction used most often in internal training:** [No response.]
- 7a. **Who developed agency's online training?** VDOT provides online training from various sources. We develop custom content in-house for systems or other agency-specific material, obtain online content from other state agencies, and purchase off-the-shelf content for more general topic areas.
- 7b. **Examples of online courses:** Online project management training to include PMBOK [project management body of knowledge] (PMI developed) training, traffic operations training, interpersonal skills provided by Skillsoft. Other vendor options have been reviewed and may be added as funding permits. In addition, all materials recertifications have an online component (in-house developed) as well as a locally administered hands-on proficiency.
- 7c. **Percentage of all training that is presented online:** This is difficult to answer without more specifics, but the majority of VDOT training continues to be executed in person via instructor-led offerings. Because of limited computer access by field personnel, VDOT is limited in the items which can be deployed strictly by online offerings. Much of the online training which is available focuses on soft-skill development or system-specific material for those with computer access using agency applications or resources.
8. **Who delivers instruction?** VDOT utilizes a mix of both employees and external sources to deliver training for our workforce. The VDOT Human Resources and Training (Learning Center) training staff delivers most leadership training with an emphasis on integrating classroom learning with field application. VDOT employees as well as industry representative[s] deliver our materials certification training. The Learning Center also maintains an adjunct bench of consultant trainers capable of delivering on demand an array of training ranging from customer service training for our entire workforce to survey and plan reading courses for our inspector trainees.
9. **Catalog of educational opportunities?** See representative sampling attached. [The file provided did not open.]
10. **Successes in providing or supporting training:** From 2004 to 2010, the VDOT Learning Center ran a structured Project Management Development Program, supported in large measure by contract with ESI through George Washington University. Courses were modified to incorporate VDOT scenarios, and targeted the audience below.

ROLE	TRAINING LEVEL
Residency Project Manager (Contract Administrator, Maintenance, etc.)	Local Technical Assistance Program (LTAP) One day class – overview
District Maintenance, Project Manager (Traffic Engineering, Structure & Bridge, etc.)	ESI <ul style="list-style-type: none"> • Project Planning • Analysis and Control

District 'Dual-Hat' Project Manager (Location & Design, Structure & Bridge)	ESI – level one, Associate's Certificate
Dedicated Project Manager and Project Management Office	ESI – level two, Master's Certificate
Major/Mega Projects Project Manager	PMP [Project Management Professional] Certification

Once VDOT reached saturation with existing project management employees, we moved from this structured approach to ad hoc, utilizing UVA Transportation Training Academy (formerly LTAP), and a two-week Transportation Project Management Institute (also run by UVA).

11. **Challenges in providing or supporting training:** VDOT continues to work with institutions of higher learning, our industry partners and other key stakeholders to develop progressive continuous learning plans for all our employees, but especially our technical engineering staff. The number and variety of professional engineers with specialized skills ready to meet the future needs of our agency and the industry in Virginia must continue to grow. The department's ability to focus that growth, specify the future needs and facilitate engineer development to meet those needs, will be challenges for the foreseeable future.
12. **Other comments:** The questions and responses to this survey are inherently broad and further discussions may be necessary. Please feel free to contact me to discuss the responses if additional information is required.

Related Document:

Project Management Program, VDOT University, undated.

See [Appendix O](#).

This brochure describes the Project Management Development Program. From the document:

PROJECT MANAGEMENT DEVELOPMENT PROGRAM (PMDP) is offered through VDOT University to specific employees actively performing in targeted project management roles. The program introduces a common language for projects along with specific skills and techniques to increase our consistency in delivery of quality projects.

Washington

Contact: Jeff Carpenter, Director, Project Development Division, Washington State DOT, 360-705-7231, carpenj@wsdot.wa.gov.

1. **Engineering job classifications:** [See [Appendix A](#).]
2. **Continuing education requirements for each job classification:** Occasional training.
 - 2a. **Require professional development units for each classification?** None.
3. **Offer elective educational opportunities?** Yes.
 - 3a. **Types of classes offered:** NHI classes, online classes, occasional instructor-led training on a case-by-case basis.
 - 3b. **Class offerings vary by job classification?** Some classes are of more relevance depending on job classification.
 - 3c. **Incentives for participation in elective training?** No.

4. **Support employee participation in external training?** No.
- 4a. **Level of employee participation in external training:** Fairly low.
- 4b. **Pay for employee participation in external training?** No.
5. **Programs or practices to train and develop engineering staff:**
 - Organizational support for completion of advanced degree:** No.
 - Communities of practice:** Yes (for example, LEAN).
 - Cross-training:** Yes (generally informal between offices or staff).
 - Job rotation:** Yes (in the past this was more common).
 - Leadership programs:** Yes (for selected staff).
 - Mentoring/coaching:** Yes (informal).
 - Other practices or programs:** Yes (online self-paced learning Skillsoft; in-house conferences).
6. **Modes of instruction used most often in internal training:** At this time the most easily access[ed] training is the online Skillsoft training.
- 7a. **Who developed agency's online training?** Developed in-house or by a consultant; off-the-shelf.
- 7b. **Examples of online courses:** E-books and courses, such as: Intro to Lean; Managing Workforce Generations, Leadership and Change, Communication, others.
- 7c. **Percentage of all training that is presented online:** 50%.
8. **Who delivers instruction?** Mix of employees and consultants.
9. **Catalog of educational opportunities?**
<http://www.wsdot.wa.gov/publications/fulltext/design/cae/training/LMS%20output/story.html>
10. **Successes in providing or supporting training:** WSDOT in the past has had a very robust training program for project development; this training provided fertile ground for the growth of Project Management, Cost Risk Assessment, Value Engineering, and now Practical Design Implementation in the agency.
11. **Challenges in providing or supporting training:** Financial constraints challenge our ability to maintain robust training programs.
12. **Other comments:** Training is a continuing need; with ongoing financial constraints the provision of training continues to be a challenge for agencies in our industry. Our WSDOT agency is committed to LEAN—continuous improvement, employees' growth and development. Our Secretary of Transportation issued Executive Order (E 1096.00), which recognizes the value of WSDOT employees and the need to invest in the health, safety and development of the WSDOT team.

Related Document:

WSDOT Training-Design, Washington State DOT, undated.

See [Appendix T](#).

This Excel spreadsheet provides a list of the design-oriented classes available to WSDOT engineers.

Wisconsin

Contact: Lisa Piekarski, Human Resources Specialist, Bureau of Human Resource Services, Wisconsin DOT, 608-264-9529, lisa.piekarski@dot.wi.gov.

1. **Engineering job classifications:** [See [Appendix A.](#)]
2. **Continuing education requirements for each job classification:** [No response.]
- 2a. **Require professional development units for each classification?** No, we do not. The only educational requirements we have are a Bachelor's Degree in Engineering for the entry level, and then at the Advanced level we require they hold a PE license.
3. **Offer elective educational opportunities?** Yes, a lot of electives.
- 3a. **Types of classes offered:** This is almost impossible to answer succinctly. There are classes offered under every bureau area and topic area within DTSD [Division of Transportation System Development]—project development, systems planning, construction, highway operations, traffic, new employees, supervisors, structures, technical services, planning, design, emergency management, Title VI, Civil 3D, environmental, real estate, etc.
- 3b. **Class offerings vary by job classification?** Yes.
- 3c. **Incentives for participation in elective training?** No.
4. **Support employee participation in external training?** Engineering is technical enough that we find little value in MOOC-style online offerings. DTSD staff [does] participate in some types of trainings offered by academic institutions with engineering departments such as UW–Platteville or UW–Madison. And sometimes we bring their instructors here, for instance for ethics training. Additionally engineering staff are encouraged to take classes through the National Highway Institute at <https://www.nhi.fhwa.dot.gov/home.aspx>. NHI offers hundreds of online and classroom courses in a wide range of technical topics—many are no cost for our employees. We like NHI.
- 4a. **Level of employee participation in external training:** Varies.
- 4b. **Pay for employee participation in external training?** During each calendar year, employees may be granted up to five (5) days (i.e., 40 hours) without loss of pay, at management's discretion, to attend or participate in career-related professional meetings, conventions, certification exams, institutes, seminars, continuing education or workshops directly related to the advancement of the employee's professional development. The employee must submit their request to attend such meetings in writing to management at least 14 days prior to the event.

Employees are required to provide management supporting documentation with their requests. Supporting documentation may include, but is not limited to, meeting dates and agendas, examination date(s) and location, training or educational syllabus, etc., as required by management. Management may also approve payment of all, or a portion of, related travel expenses and event fees.

5. **Programs or practices to train and develop engineering staff:**
 - Organizational support for completion of advanced degree:** No.
 - Communities of practice:** No.
 - Cross-training:** Yes, but this varies by region. We have 5 regions and then the

Statewide Bureaus (5 of those as well). Each region/bureau [does] their own/[has] their own plans in place for this.

Job rotation: Yes, but this varies by region. We have 5 regions and then the Statewide Bureaus (5 of those as well). Each region/bureau [does] their own/[has] their own plans in place for this.

Leadership programs: There are several that are offered; varies by division, department and statewide.

Mentoring/coaching: There is a formal mentoring program for new hires. They are paired up with a more senior engineer. They also attend workshops on various topics presented by the mentoring committee members.

6. **Modes of instruction used most often in internal training:** We offer all of these options, and additionally offer webinars and online collaborative learning environments. Traditionally, much has been done in classroom settings, but by employee demand, online learning events are very popular and growing in number.
- 7a. **Who developed agency's online training?** A mix of in-house or consultant, and purchased as an off-the-shelf.
- 7b. **Examples of online courses:** All kinds, technical in nature, some leadership courses, too many to list.
- 7c. **Percentage of all training that is presented online:** Hard to estimate as some of the courses that are instructor-led are also available to view from a webinar.
8. **Who delivers instruction?** A mix of employees and consultants.
9. **Catalog of educational opportunities?** No, we are at the start of trying to organize this. There are hundreds of learning events available for engineering staff.
10. **Successes in providing or supporting training:** Positive staff feedback, more engaged staff. Accessibility of opportunities through online courses, and now more opportunities through smartboard, etc.
11. **Challenges in providing or supporting training:** Geography, timeliness and lack of trainers/resources.
12. **Other comments:**
 - August 1, 2012, new administrative code went into effect requiring continuing education credits (Professional Development Hours) for engineering license renewals. DTSD and some DTIM [Department of Transportation Investment Management] staff often focus on courses that help them meet the renewal requirements.
 - We have just received approval to proceed on the development of a social learning community (called Connect) for DTSD technical staff. We think this will be a perfect crossroads for the inclusion of outside consultants as subject matter experts.