



## SCAN TEAM REPORT

NCHRP Project 20 68A, Scan 13-01

# Advances In Developing A Cross-Trained Workforce

*Supported by the*  
National Cooperative Highway Research Program

The information contained in this report was prepared as part of NCHRP Project 20-68A U.S. Domestic Scan, National Cooperative Highway Research Program.

**SPECIAL NOTE:** This report **IS NOT** an official publication of the National Cooperative Highway Research Program, Transportation Research Board, or the National Academies of Sciences, Engineering, and Medicine.



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The purpose of each scan and of Project 20-68A as a whole is to accelerate beneficial innovation by facilitating information sharing and technology exchange among the states and other transportation agencies, and identifying actionable items of common interest. Experience has shown that personal contact with new ideas and their application is a particularly valuable means for such sharing and exchange. A scan entails peer-to-peer discussions between practitioners who have implemented new practices and others who are able to disseminate knowledge of these new practices and their possible benefits to a broad audience of other users. Each scan addresses a single technical topic selected by AASHTO and the NCHRP 20-68A Project Panel. Further information on the NCHRP 20-68A U.S. Domestic Scan program is available at <http://144.171.11.40/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=1570>.

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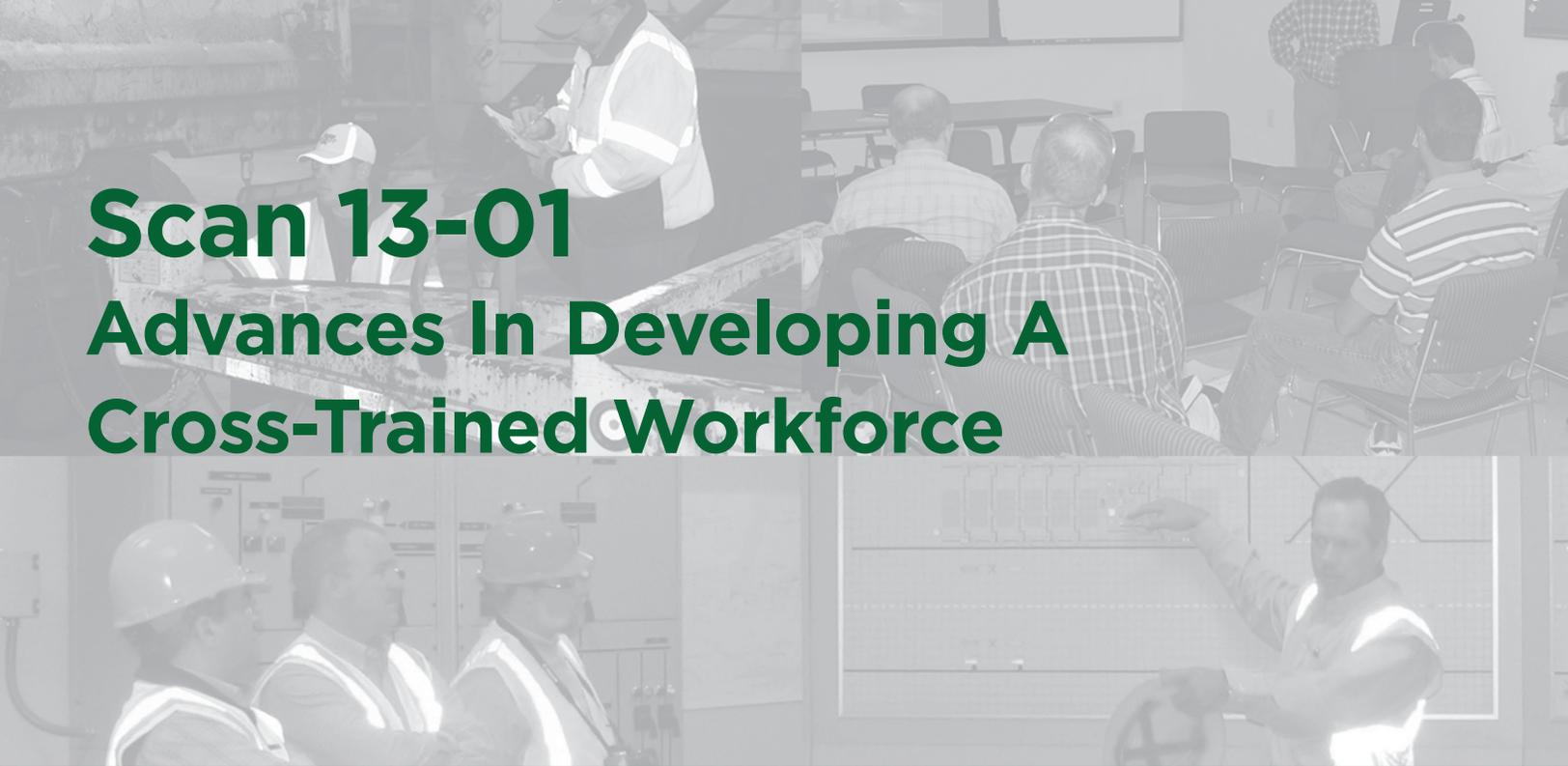
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# Disclaimer

The information in this document was taken directly from the submission of the authors. The opinions and conclusions expressed or implied are those of the scan team and are not necessarily those of the Transportation Research Board or its sponsoring agencies. The report has not been reviewed by and is not a report of the Transportation Research Board or the National Academies of Sciences, Engineering, and Medicine.



# Scan 13-01

## Advances In Developing A Cross-Trained Workforce

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American Association of State Highway and Transportation Officials

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# Abbreviations and Acronyms

<b>AASHTO</b>	American Association of State Highway and Transportation Officials
<b>AFSCME</b>	American Federation of State, County & Municipal Employees
<b>ALD</b>	Accelerated Leadership Development (Missouri DOT)
<b>APEX</b>	Accelerated Professional Engineering Cross-Training (Missouri DOT)
<b>Caltrans</b>	California Department of Transportation
<b>CE&amp;I</b>	Construction Engineering and Inspection
<b>ConnDOT</b>	Connecticut Department of Transportation
<b>CT</b>	Cross-Training, Cross-Train
<b>DES</b>	Division of Engineering Services (Caltrans)
<b>DOT</b>	Department of Transportation
<b>EIT</b>	Engineer in Training (Utah DOT)
<b>HT</b>	Highway Technician (Iowa DOT)
<b>HTA</b>	Highway Technician Associate (Iowa DOT)
<b>HTS</b>	Highway Technician Senior (Iowa DOT)
<b>HR</b>	Human Resources
<b>LDP</b>	Leadership Discovery Program (National Institutes of Health)
<b>LMS</b>	Learning Management System
<b>MI</b>	Management Intern Program (National Institutes of Health)
<b>MLA</b>	Maintenance Leadership Academy (Missouri DOT)
<b>MoDOT</b>	Missouri Department of Transportation
<b>NCHRP</b>	National Cooperative Highway Research Program
<b>NHI</b>	National Highway Institute
<b>NIH</b>	National Institutes of Health
<b>OHR</b>	Office of Human Resources (National Institutes of Health)
<b>PE</b>	Professional Engineer
<b>PMF</b>	Presidential Management Fellows Program (National Institutes of Health)
<b>SME</b>	Subject Matter Expert
<b>TDOT</b>	Tennessee Department of Transportation
<b>TEP</b>	Transportation Education Program (Utah DOT)
<b>TLDS</b>	Team Lead Development Series (National Institutes of Health)
<b>TNG</b>	The Next Generation Program (National Institutes of Health)
<b>TRB</b>	Transportation Research Board
<b>TRID</b>	Transportation Research International Documentation (database)
<b>UDOT</b>	Utah Department of Transportation
<b>USDOT</b>	U.S. Department of Transportation
<b>VDOT</b>	Virginia Department of Transportation

# Executive Summary

This report summarizes findings from a scan workshop of cross-training (CT) within transportation agencies and other organizations. The purpose of this scan was to investigate how agencies are using workforce CT as a strategy for enhancing agency efficiency and agility in adapting to changing missions, priorities, and budgets; and conditions under which CT strategies are applicable and appropriate.

A scan team consisting of state departments of transportation (DOTs) and the U.S. Department of Transportation (USDOT) administration staff was formed to guide the scan and develop findings, recommendations, and dissemination actions. Scan team members brought a diversity of CT dissemination experience and an understanding of DOT management and workforce challenges to the table. Scan team members and host agencies met in March 2015 to share their practices. In all, scan participants reviewed CT activities in nine state DOTs (California, Connecticut, Iowa, Missouri, Ohio, Oregon, Tennessee, Utah, and Virginia) and one federal agency (the National Institutes of Health).

Scan participants discussed the following topics:

- **Design/Development:** Tasks or disciplines involved, agency factors precipitating CT, affected job functions, and special labor groups
- **Dissemination:** Level of involvement of leadership and employees
- **Performance Measures/Management:** Program goals and how success is measured
- **Organizational Issues:** Any organizational challenges such as political, cultural or workforce;
- **Resources:** Any resources needed to implement and sustain CT (e.g., financial, management, or employees)

Scan participants discussed CT applications, including:

- **Leadership development** techniques to develop leaders to fill anticipated gaps in critical expertise
- **Cross-utilization** to develop a flexible workforce
- **Informal CT activities** to ensure continuity
- **Job rotation** to ensure sufficient resources for critical functions

Host agencies discussed combining CT activities to develop robust programs that minimize the impact of employee transitions and build a strong foundation for cost savings. Scan team members identified an extensive set of dissemination activities to communicate the findings and support further adoption of CT practices.



# Introduction

## Background

**T**ransportation agencies face increased pressures to adapt to new demands and shrinking revenues. At the same time, many agencies are in the midst of a wave of baby-boomer retirements and struggle to attract and retain employees with the skills and experience needed to deliver transportation services. In this environment, agencies are seeking new approaches to better using available resources to improve efficiencies and deliver value to the traveling public.

Cross-training (CT) is an established employee-development approach many public and private sector organizations use to improve performance, create a culture that enables innovation, and reduce disruptions associated with workforce transition. While there are many examples of successful CT application, CT experience within transportation agencies is underreported.

## Scan Purpose and Scope

A scan team investigated applications of CT in state departments of transportation (DOTs) for the purpose of workforce development. The scan includes:

- Investigation of related agency statistics and applicable legislation, rules, standards, policies, and mandates pertaining to worker CT
- Identification of dissemination strategies, advances in practice, emerging technologies and lessons learned, and barriers to dissemination
- Identification of supporting documents, including training plans and required certifications
- Identification of supporting performance measures, including metrics, performance evaluations, and corrective action procedures
- Identification of sustainability topics, such as ensuring future resources, succession planning and training, and developing and maintaining champions
- Identification of successful strategies and conditions under which each is applicable and best suited
- Documented examples of successful CT programs, position descriptions, and dissemination plans

## Scan Team

The Domestic Scan Program Management team assembled a team led by American Association of State Highway and Transportation Officials (AASHTO) chair, Amanda Holland, to guide scan activities and develop findings, recommendations, and dissemination actions. Scan team membership included representatives from each of the AASHTO regional associations and the U.S. Department of Transportation (USDOT).

## Scan Approach and Participants

Scan team members drafted a set of amplifying questions to establish a well-defined scope and aid in identifying agencies that use CT. Team members designed the questions to solicit information specific to how agencies are using CT.

Once the amplifying questions were created, the subject matter expert (SME) conducted a desk scan to identify transportation agencies with documented CT activity. The desk scan highlighted pertinent literature on the Transportation Research International Documentation (TRID) database and selected transportation research websites. The desk scan produced a list of agencies to invite to participate in the scan. Team members and the assigned SME also made recommendations for additional invitees. While the scan's focus was on transportation agencies, a limited search of public agencies and private organizations known to use CT produced additional agencies to include. Based on the information gathered, scan team members developed a prioritized list of agencies that merited further investigation.

Scan team members and supporting staff held a daylong meeting in October 2014 to review the results of the desk scan, refine amplifying questions, and select organizations to include in the scan.

Once the team had a list of agencies, it e-mailed invitations to agency representatives requesting further information on the status of their CT-related activities. The invitation included an outline of the topics covered by the amplifying questions to communicate the scan's scope. Follow-up phone calls with transportation agency representatives were made either to invite additional agencies to participate in the scan or to answer questions regarding the scan.

A four-day scan meeting was held in San Diego, California, in March 2015. During the first three days of the meeting, the scan team heard presentations from nine state DOTs (California, Connecticut, Iowa, Missouri, Ohio, Oregon, Tennessee, Utah, and Virginia) and one federal agency (the National Institutes of Health [NIH]). On the final day, scan team members met to synthesize their findings, make recommendations, and develop dissemination strategies for their findings.

### Learning Point

*“Cross-training benefits an organization by building a more diversified staff with a stronger skill set and greater understanding of the jobs that are performed by their coworkers, which, in turn, fosters better leaders, improved teamwork, and employees with a more expansive comprehension of the work we do as a department.”*

## Report Organization

This report documents the scan meeting's results. It is organized in three major chapters:

- Chapter 2.0 presents key findings and observations, with relevant examples from the presentations and background material provided by participants.
- Chapter 3.0 provides a brief summary of CT strategies employed by state DOTs and recommendations for creating CT programs based on the scan findings.
- Chapter 4.0 identifies actions that scan team members recommend to disseminate findings and foster adoption of beneficial CT practices.



# Scan Findings and Observations

The scan team organized its findings and observations into three categories:

- **General Findings** – the needs of a department and its employees, program design, and key considerations (e.g., the culture)
- **Conclusions and Recommendations** – specific CT program elements
- **Dissemination Strategies** – how to share scan information with state DOTs at all levels

## General Findings

### Definition of Cross-Training

CT means different things to different organizations. The scan team observed that some people equate CT with job rotation and use the terms interchangeably. While the scan team acknowledged that these terms are defined in different ways, the team agreed to recognize them as having the same meaning; the team also agreed to include job shadowing. The scan team established the following working definition: *teaching an employee hired to perform one job function the skills required to perform other job functions.*

### Common Terms

It is important to note that organizations are embedding CT activities within workforce development programs. For example, host agencies reported integrating CT activities in their cross-utilization strategies and rotational programs for engineers or future leader programs. For those agencies, CT is one activity of many that support an overall program.

Engineering rotation is an example of a program with CT elements. Pairing a less experienced engineer with an experienced engineer or a unit within the organization is an example of CT.

### Context for Cross-Training

Several key factors (Table 2.1) are creating the imperative for DOTs to consider new approaches to developing and managing their workforce. First, many DOTs have been facing the loss of their

#### What do these terms mean to you?

**The terms cross-training, cross-utilization, job rotation, and job shadowing are sometimes used as synonyms and sometimes as terms with different meanings. For the purpose of this investigation, cross-training is defined as teaching an employee hired to perform one job function the skills required to perform other job functions.**

most experienced staff, and a growing number of DOT employees are eligible for retirement. Second, younger and mid-career employees are changing jobs more frequently, transitioning both within the organization and across organizations. This increased level of movement within the workforce means that DOTs are constantly facing the loss of valuable employee expertise. If not managed in a proactive fashion, this loss of institutional knowledge and experience can impede organizational efficiency and effectiveness.

A second key driver of CT is the desire to improve organizational effectiveness and support both innovation and efficiency improvements. Organizations view CT as a way to improve collaboration, teamwork, organizational learning, and employee development—all of which are seen as necessary ingredients for innovation and efficiency gains.

Third is the changing nature of the workforce. Newer generations of workers have different expectations about work. They expect rapid progression and training and are quick to become disengaged. If they do not receive training at the pace they desire, they are more likely to leave an organization when they are dissatisfied when compared to their predecessors.

Lastly, like most organizations, DOTs are seeing decreases in funding, continued growth in their construction programs, and increased expectations from their customers. There is growing recognition of the importance of preserving limited funds for the delivery of construction programs. For example, Tennessee DOT<sup>1</sup> (TDOT) reported that it used CT in an effort to increase the core competency of its construction and maintenance staff to save dollars typically outsourced. Ohio DOT<sup>2</sup> has managed its growing construction program without increasing the number of permanent employees.

***Cross-training benefits an organization by building a more diversified staff with a stronger skill set and greater understanding of the jobs that are performed by their coworkers, which in turn fosters better leaders, improved teamwork, and employees with a more expansive comprehension of the work we do as a department.***

**Lori Kirkendoll,  
Office of Enterprise Risk  
Management, Caltrans**

Agency	Driving factors for CT initiatives
Caltrans <sup>3</sup>	Succession planning, career development, and having employees trained in multiple functions allow the department to continue to deliver products and services in a timely way.
Connecticut DOT <sup>4</sup> (ConnDOT)	Development of new college graduate design engineers hired as trainees who lacked field exposure
Iowa DOT <sup>5</sup>	Cross-utilization of field staff is the need to maintain a staff level and staff competence that can deliver a high level of performance in two key business areas: delivery of construction projects and winter operations

**Table 2.1** *Driving factors for interest in cross-training at participating organizations*

1 Tennessee Department of Transportation, <https://www.tn.gov/tdot>  
 2 Ohio Department of Transportation, <http://www.dot.state.oh.us/pages/home.aspx>  
 3 Caltrans (California Department of Transportation), <http://www.dot.ca.gov/>  
 4 Connecticut Department of Transportation, <http://www.ct.gov/dot/site/default.asp>

Agency	Driving factors for CT initiatives
Missouri DOT <sup>6</sup> (MoDOT)	Knowledge sharing, succession planning, retention, and employee development; create a more streamlined, efficient, and effective organization
National Institutes of Health <sup>7</sup> (NIH)	Succession management and employee engagement
Ohio DOT	A more flexible workforce, specifically in the areas of maintenance and construction
Oregon DOT <sup>8</sup>	Added bench strength, increased employee morale and productivity, and increased job satisfaction and workforce flexibility
Tennessee DOT (TDOT)	Reduce construction inspection costs and provide maintenance bench strength during snow and ice events; reduce outsourced staff; and increase core competencies
Utah DOT <sup>9</sup> (UDOT)	Better utilization of workforce: Provide greater workforce availability when necessary for increased workloads based on seasonal job duties. Maintenance had a large need in the winter months for snow removal, and construction projects operate during the summer months. CT also provides employee development opportunities and career pathways for those interested in transitioning to other divisions within UDOT.
Virginia DOT <sup>10</sup> (VDOT)	To address the need for continuity of operations, along with improving employee retention, engagement, and succession planning. To address succession planning and long-term needs for talent that is ready to perform current work and meet future work demands

*(Continued) Table 2.1 Driving factors for interest in cross-training at participating organizations*

## Value of Cross-Training

Workforce retirements and a weakening economy create both challenges and opportunities for DOTs as they seek to improve delivery of transportation projects and services with increasingly limited resources. DOTs can draw upon CT techniques to navigate these challenges, foster innovation, and enhance organizational efficiency and effectiveness.

Many DOTs have periods of seasonal work. In particular, where the winter months are harsh and maintenance and construction work slows down, CT allows them to make sure that maintenance and construction forces are used effectively during these periods. Organizations that have implemented CT report that it has helped them to utilize workers during these periods. Examples of CT dissemination at the federal level, including the National Institutes of Health (NIH), indicate that substantial investments in CT over a sustained timeframe are being made because executive managers recognize the payoff from these activities.

Employees of DOTs that implemented informal CT also see the benefits of CT. For example, CT enables employees to take vacations or take leave from the office knowing that coworkers can be

5 Iowa Department of Transportation, <http://www.iowadot.gov/index.html#/services>

6 Missouri Department of Transportation, <http://www.modot.org/>

7 National Institutes of Health, <http://www.nih.gov/>

8 Oregon Department of Transportation, <http://www.oregon.gov/ODOT/Pages/index.aspx>

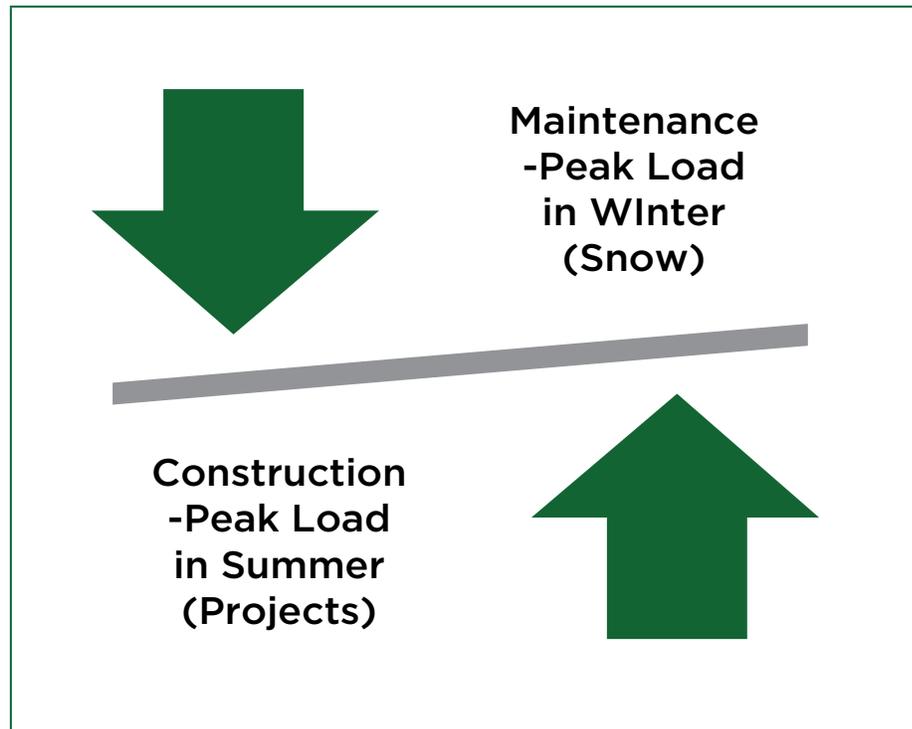
9 Utah Department of Transportation, <http://www.udot.utah.gov/main/?p=100:6:0:::V,T:,1>

10 Virginia Department of Transportation, <http://www.virginiadot.org/>

backups and are prepared to perform their duties while they are away.

Overall, DOTs and their employees see the benefits of CT, from the very basics of allowing them to go on vacation without worrying about whether assignments will be done while they are gone, to the opportunities CT provides by expanding their skill set and helping them become more competitive for promotional opportunities.

### Why DOTs Cross-Train



*Figure 2.1 Cross-utilization strategy*

The scan revealed a number of reasons DOTs CT. Perhaps the most common reason is to better utilize the workforce during peak seasons. Other reasons include:

- **Career development** – creating job ladders
- **Cross-utilization** – utilizing work units to share in seasonal work
- **Foster better leaders** – identifying and developing leaders early in their career
- **Improved teamwork** – exchanging knowledge between job functions
- **Succession planning** – preparing the organization for retirements
- **Trained backups for coverage** – training employees to fill in when the primary person is away for an extended time



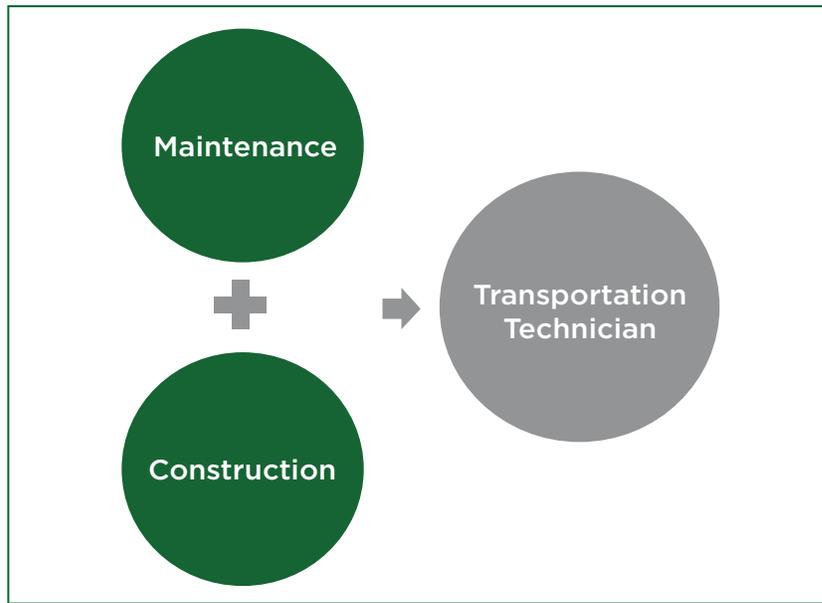
**Figure 2.2** *Benefits of cross-training*



# Conclusions and Recommendations

**M**any DOTs begin by using CT on a limited scale. For example, some may incorporate CT into leadership development or succession management programs. Some DOTs employ CT activities as part of restructuring the organization, thereby creating opportunities for employee advancement, cross-utilization of workers, and employee learning. Others might emphasize informal CT to ensure business continuity. Organizations that participated in the scan either began using CT activities within the last 10 years or more recently began pursuing CT based-initiatives within limited areas or to ensure business continuity. The examples below illustrate the varied ways DOTs use CT:

- TDOT cross-trained employees of regional construction and maintenance divisions to consolidate forces.
- ConnDOT pairs bridge designers with inspectors. This experience informs designers about when and where maintenance and repairs occur in the project life cycle and teaches designers how to design mitigations based on an understanding of inspector reports.
- Iowa DOT developed a Shared Worker Program after experiencing a significant downsizing in 2001/2002.
- MoDOT has an accelerated Professional Engineers (PE) CT Program, which has a duration of one year and is open to engineers in training who have been with the department for three to five years.
- Ohio DOT used CT to augment construction knowledge, skills, and abilities and incorporated a blend of maintenance and construction duties into one classification series.
- Oregon DOT has effectively rotated right-of-way employees into different areas of its program to provide experience that prepares them to take over critical positions as they become open.
- UDOT implemented CT in 2004 for all maintenance and construction working levels and maintenance and construction engineers at the regional level.
- At VDOT, supervisors focus on addressing needs for continuity of operations.



**Figure 3.1** Evolution of UDOT’s Transportation Technician Program

## Point of Contact and Resources

One topic of interest to scan team members concerned whether there is a single point of contact or a unit responsible for monitoring and tracking CT. Table 3.1 summarizes the organizational contacts for each scan participant.

Agency	Point of Contact	
Caltrans	Office of Enterprise Risk Management’s Workforce Planning Unit	
ConnDOT	Richard A. Prescott, P.E. – TE3 E-mail: richard.prescott@ct.gov, Phone: (860) 594-2708;	Ashley Heredia – TE1 E-mail: ashley.heredia@ct.gov Phone: (860) 394-7225
Iowa DOT	Robert(Bob) A. Younie Director – Office of Maintenance, State Maintenance Engineer E-mail: bob.younie@dot.iowa.gov Phone: (515) 239-1589	
MoDOT	Kristen Bagwill Human Resources Employee Development Manager E-mail: kristen.bagwill@modot.mo.gov Phone: (573) 751-3941	
NIH	Multiple points of contact	
Ohio DOT	Daveen Goodman, Administrator	
Oregon DOT	Multiple points of contact	
UDOT	Lorri Economy Director of Learning and Development Rick Murdock Training Manager for Rotational Engineer Programs	
Virginia DOT	Varies by program	

**Table 3.1** Cross-training contacts at participating scan organizations

The scan team observed that many organizations use CT either formally or informally. Designating a CT lead and resources is not essential to the success of the activities. Implementing CT does not necessarily require hiring new staff; there may be opportunities to leverage or repurpose existing staff resources. CT works best if there is a champion who is member of the senior leadership team. A champion at this level adds credibility to CT and ensures that leaders view CT as an important strategic lever for achieving the organization’s mission and managing risk rather than as lower-level support function.

## Findings on Cross-Training Practices

CT encompasses a wide range of practices for leadership development, cross-utilization of resources, collaboration, and fostering individual and group learning. Many agencies consider CT activities to be tools for succession planning, business unit restructuring, and job rotation because they facilitate the transfer of organizational knowledge from those who have it to those in training. Therefore, it is important to recognize that CT practices serve multiple purposes and are mutually reinforcing. For example, cross-functional team building supports collaboration and increased efficiencies. Findings on specific CT-based practices, such as restructuring job classes, are presented in Table 3.2.

Topic and tasks	Brief description	Might be good for	Resources
<i>Development of Leaders</i>			
Rotation program	Selected employees work in one or more new areas	Employees showing leadership promise	High
Leadership program	Selected employees receive agency exposure	Employees showing leadership promise	High
<i>Trained Backups</i>			
Informal CT program	The essential functions of the job are the focus of CT	Units with high turnover; critical administrative positions	Low
<i>Flexible Workforce</i>			
Maintenance and Construction	Consolidating job classes	Units with overlapping functions	Moderate

**Table 3.2** *Cross-training-centered applications*

CT activities are used to train employees on activities beyond those that they were hired to perform. These activities can improve work quality and reduce the risk of project failures by ensuring that a sufficiently sized workforce exists. It is particularly valuable when individuals who have received CT in a job function not within their normal duties can be called on when needed. Several effective techniques were identified to support restructuring.

## Consolidating Job Classes

### Iowa's Shared Worker Program

In 2001/2002 Iowa DOT experienced significant downsizing. The downsizing led to the elimination of 403 positions, all temporary construction and snowplow operators, 27 maintenance garages, 7 construction residencies, and 100 snowplow trucks.

The department negotiated with the American Federation of State, County & Municipal Employees<sup>11</sup> (AFSCME)/Iowa Council 61<sup>12</sup> to develop the Shared Worker Program. The negotiations addressed the council's concerns, which included work assignments/direction, meals, travel/overnights, eligibility and who has to do shared worker duties, vacation/compensatory time, overtime and overtime equalization, and performance evaluations.

The negotiations resulted in the creation of highway technician associate, highway technician, and highway technician senior job classes. The new job classes include responsibilities that support both maintenance and construction activities.

### Tennessee's Regional Construction and Maintenance Merger

TDOT's program began with two major objectives, which came out of its "top to bottom" review:

- Consolidate regional construction and maintenance divisions
- Reduce construction engineering and inspection (CE&I) usage by rebuilding construction staff to a level that facilitates increased in-house departmental CE&I.

The department's process of achieving its goals started with the development of dissemination teams. According to Greg Duncan, assistant chief engineer for Operations, "We carefully chose team members from across the state who we believed were open-minded, innovative, experienced in their fields, and were the most qualified to shape the future of the department." The dissemination team's recommendation led to the development of super districts, which facilitate the sharing of resources throughout the year.

11 American Federation of State, County & Municipal Employees, <http://www.afscme.org/>

12 AFSCME Iowa Council 61, <http://www.afscmeiowa.org/>

#### New Highway Technician Class

- Shared workers will plow snow in the winter and work in construction in the summer
- Operates highway maintenance equipment
- Supports engineering by inspecting, monitoring, and surveying construction projects; samples, inspects, and tests materials used in highway construction
- An estimated 200 vacant highway technician associate positions would be reclassified as highway technicians

#### Learning Point

*"A CT champion, representing senior leadership within the organization, is an important strategic lever."*

The department established CT requirements for all operations classifications to facilitate the transition. Figure 3.2 lists the training requirements for Operations employees under the new organizational structure.

**Table A: Training Course Requirements**

Required Training Course	Operations Tech. 1	Operations Tech. 2	Operations Tech. 3	District Operations Assistant	District Operations Specialist	District Operations Supervisor
Work Zone Flagging	X	X	X	X	X	X
Basic Work Zone Safety	X	X	X	X	X	X
Intermediate Work Zone Safety	X	X	X	X	X	X
Work Zone Traffic Control Supervisor			X	X	X	X
Work Zone ADA Compliance				X	X	X
Basic Highway Math	X	X	X	X	X	X
10-Hour OSHA Construction Safety	X	X	X	X	X	X
Winter Maintenance Operations	X	X	X	X	X	X
Basic Computer Skills	X	X	X	X	X	X
Construction Plans Reading		X	X	X	X	X
TDOT EPSC	X	X	X	X	X	X
TDEC Level 1 EPSC		X	X	X	X	X
Respectful Workplace	X	X		X	X	
Respectful Workplace for Managers			X			X
Performance Coaching			X			X

Operations Training Requirements 1

**Figure 3.2** *TDOT training requirements*

### Leadership Development

A second valuable CT function is to provide structure that supports leadership development. Host agencies shared how CT activities are integrated into management and leadership development programs, including succession planning and engineer rotation programs.

### NIH's Office of Human Resources

Sarah Crowell of the NIH's Office of Human Resources (OHR) reported that her office administers multiple development programs that incorporate CT activities. Each program is designed for a specific category of potential leaders and career-oriented employees. According to Crowell, all OHR programs focus on level of experience instead of tasks or discipline.

## Improving Utilization of Workforce

CT contributes to workforce efficiencies. One purpose for CT is to create a workforce flexible enough to be assigned where the workload is the greatest during a given period. This ensures that during seasonal periods a DOT has sufficient trained forces to manage the workload demands.

## Organizational Considerations

An area of interest and subsequent discussion by scan team members revolved around organizational considerations. Host agencies reported on challenges that need to be considered when utilizing CT. Scan team members organized these considerations into five subcategories that address the type of workforce, the role of Human Resources (HR) in a CT program, available technology, culture, and paying for CT activities.

### Learning Point

*“Cross-training serves multiple purposes and is accomplished in multiple ways.”*

Scan team members found that different approaches to designing and implementing CT will be required for unionized and nonunionized workplaces. The greatest challenge with implementing CT where collective bargaining units exist relates to job classifications. DOTs that have been successful in this area have invited collective bargaining units to participate from the very beginning. ConnDOT reported that its program is voluntary. It is neither institutionalized nor part of any written job description. Therefore, there are no collective bargaining agreement requirements.

From a human resources perspective, scan team members learned compensation and classification concerns could prevent a DOT from using CT to the maximum extent possible. Host agencies reported when CT is planned to support reclassification of jobs, the classification work should be completed up front.

Another consideration discussed is the use of technology both for administration and for training. Following discussions with host agencies, the team determined CT programs and individual activities could be implemented with or without technology. VDOT uses its learning management system (LMS) (Meridian® Knowledge Solutions<sup>13</sup>) to capture and report on CT activities. Other agencies (e.g., UDOT) use a combination of applications to administer their CT activities, including [Canvas](#)<sup>14</sup> (an LMS), Adobe Connect<sup>15</sup>, and a database.

Approaches to the delivery of training vary, too. Approaches the host agencies discussed represent a blended learning approach and the full catalog of delivery options and tools, including e-learning, Webconnect<sup>16</sup>, DVD, online, instructor-led, and tablets.

The NIH provided perhaps the best example of the comprehensive use of technology. The

13 Meridian® Knowledge Solutions, LLC, <http://www.meridianks.com/>

14 Canvas, Instructure, <https://www.canvaslms.com>

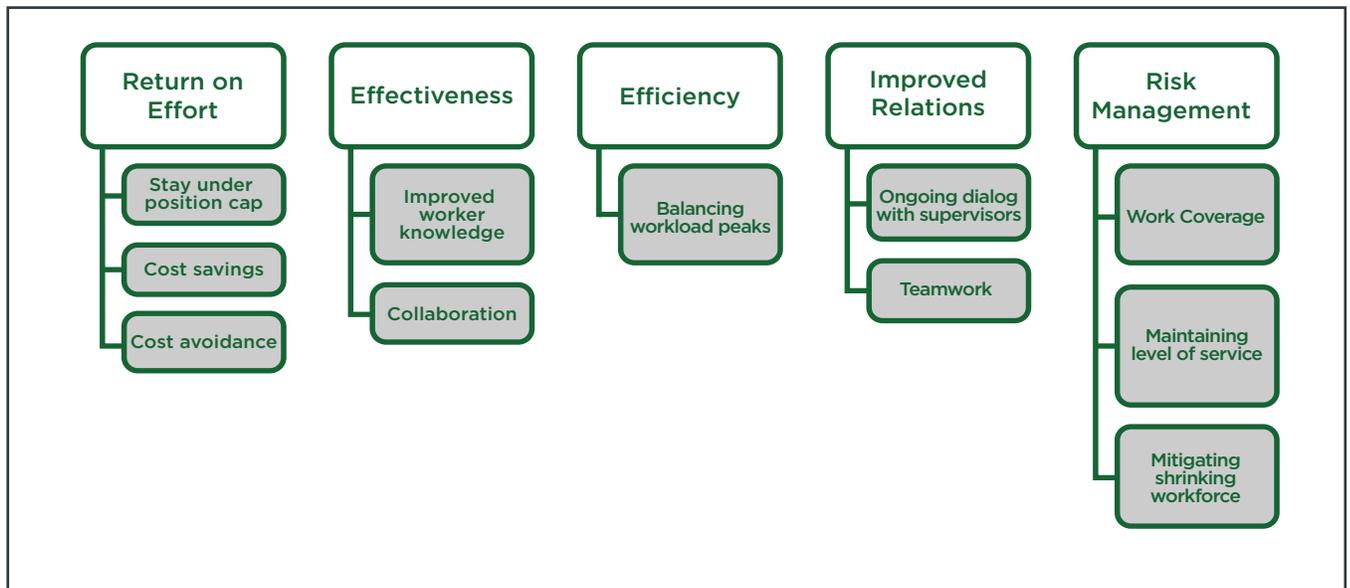
15 Adobe, Adobe Systems Incorporated, <http://www.adobe.com/>

16 Webconnect, SMA Solar Technology AG, <http://www.sma-america.com/products/monitoring-control/webconnect.html>

organization uses a SharePoint<sup>17</sup> site to administer each of the five developmental programs discussed; two of the five deliver training to distance learners via WebEx<sup>18</sup> or videoconferencing.

## Connecting Cross-Training to Business Outcomes

There is no single “right way” to use CT; however, as with any workforce development program, it is essential to connect any CT application to business outcomes. CT will get executive attention and support if it addresses critical business needs or serves the needs of major projects or initiatives. Once implemented, it is important to produce metrics showing how CT is adding value (see Figure 3.3).



**Figure 3.3** Cross-training supporting business goals

## Changing the Culture

All participants agreed CT is fundamentally about culture change, and the host agencies reported on the cultural challenges they overcame to use CT. CT can add value to any organization by building a culture of learning, innovation, and collaboration. Common hurdles to this culture change that must be overcome include:

- **Lack of commitment on the part of supervisors** – Supervisors are unwilling to lose employees or take on the effort of training the transitioning employee who will not stay. They don’t see the long-term payoff outweighing the short-term cost.
- **Lack of an executive champion** – A champion is someone who understands the value of CT and can influence others regarding its benefits to the organization.
- **State laws, administrative rules, and collective bargaining agreements**
- **Resistance to changing entrenched practices**

17 SharePoint, Microsoft, <https://products.office.com/en-us/sharepoint/collaboration>

18 WebEx, Cisco,

[https://signup.webex.com/webexmeetings/US/sem\\_acquisition.html?DG=01-04-07-US-12-01-02-06&TrackID=1031986&country=US](https://signup.webex.com/webexmeetings/US/sem_acquisition.html?DG=01-04-07-US-12-01-02-06&TrackID=1031986&country=US)

Culture shift is difficult and time consuming; however, it can provide long-lasting results. Organizations can work culture change into leadership messaging, change management, workforce communications, and performance evaluations.

### ***Culture at the Iowa DOT***

CT can be explicitly defined and considered in employee performance expectations and evaluations. Policies, procedures, and management communications can reflect the organization's value for CT. For example, according to State Maintenance Engineer Bob Younie, "Cross-training efforts have allowed us to change the culture of the department, breaking down silos that had existed for years between maintenance and construction/materials." He went on to say, "Union culture makes it difficult to make changes to the program."

### **Documenting and Measuring Performance**

Scan team members repeatedly observed the importance of documenting and measuring performance outcomes of CT activities. While many of the host agencies reported on their documentation processes and performance measures, not one performance process or set of measures was consistent across the host agencies. For example, UDOT's program is mandatory and is tied to promotion from Tech I to II and from Tech II to III. Therefore, the focus is on 100% participation and completion. One substantive measure of performance is that employees have to go before a peer review panel to show that they could work in maintenance and construction. VDOT ties success to completion of CT assignments and feedback from those directly involved. The agency seeks feedback both informally and formally through discussion and simple assessment tools.

The NIH had perhaps the most comprehensive performance measures approach, and its approach was consistent across the various development programs. A program evaluation is completed by the Program Manager in conjunction with the Office of Human Resources at the end of each of the programs' cohorts/sessions; it includes both quantitative and qualitative information from the participants and program manager and compares that information to the original desired objectives. The program manager of all three programs also regularly checks in with participants to ensure that the program objectives are on track and to intervene when necessary.

While no formal metrics were identified, scan team members discussed the need to establish various metrics, such as retention rates and number of qualified candidates in applicant pools.

Regarding documentation, more than one agency reported tracking participation through their LMS or an informal system not associated with their LMS, such as spreadsheet.



# Dissemination Strategies

The scan team identified strategies and actions worth pursuing and suggested sharing information with AASHTO and Transportation Research Board (TRB) membership to foster awareness and support implementation of CT activities within DOTs. These strategies and actions are summarized below. Many of the recommended actions were initiated directly following the scan meeting; others are still in planning stages.

## Strategies

- Increase understanding of CT business use the DOT community
- Distribute scan material through broad and multiple channels within DOTs
- Develop tools and resources to support CT application in DOTs
- Identify or develop an assessment tool for DOTs to use to measure CT outcomes

## Actions

- Conference presentations
  - AASHTO Standing Committee on Finance and Administration<sup>19</sup>
  - AASHTO Standing Committee on Highways<sup>20</sup>
  - International Public Management Association for Human Resources<sup>21</sup>
  - AASHTO 2016 Annual Meeting<sup>22</sup>
  - Council of University Transportation Centers<sup>23</sup> (CUTC) - 2016 CUTC Summer Meeting<sup>24</sup>
  - AASHTO cross-committee consideration – summit(AASHTO cross-committee consideration is not an official event – it is the description of an idea)
  - TRB Committees Related to Education and Training<sup>25</sup>

19 AASHTO Standing Committee on Finance and Administration, American Association of State Highway and Transportation Officials, <http://scofa.transportation.org/Pages/default.aspx>

20 AASHTO Standing Committee on Highways, American Association of State Highway and Transportation Officials, <http://highways.transportation.org/Pages/default.aspx>

21 International Public Management Association for Human Resources, <http://ipma-hr.org/>

22 AASHTO 2016 Annual Meeting, <http://www.aashtoannualmeeting.org/>

23 Council of University Transportation Centers, <http://www.mycutc.com/>

24 2016 CUTC Summer Meeting <https://www.metrans.org/2016-cutc-summer-meeting-overview>

25 TRB Committees Related to Education and Training, The National Academies of Sciences, Engineering, and Medicine, <http://www.trb.org/EducationTraining/TRBCommittees.aspx>

- Conference presentations - other
- Regional meetings
  - Northeast Association of Transportation Officials<sup>26</sup> (NASTO)
  - Southern Association of State Highway and Transportation Officials<sup>27</sup> (SASHTO)
  - Western Association of State Highway and Transportation Officials<sup>28</sup> (WASHTO)
  - Pacific Northwest Transportation Consortium<sup>29</sup> (PacTrans) – Regional University Transportation Center (UTC)
  - Mid America Association of State Transportation Officials<sup>30</sup> (MAASTO)
- State presentations/meetings
  - Executive Team, Caltrans
  - Executive Team, Oregon DOT
  - Arizona DOT, CEO
  - Executive Team, Iowa DOT
  - Oregon FHWA Division Office<sup>31</sup>
  - Alaska University Transportation Center UT
- Webinars
  - Transportation Research Board<sup>32</sup>
  - National Transportation Training Directors<sup>33</sup>
- Publications/web/print media
  - *Caltrans News*<sup>34</sup>
  - Oregon DOT employee newsletter –“Inside ODOT”
  - Trifold brochure for posting on websites and sharing with unions

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26 Northeast Association of Transportation Officials, <http://nasto.org/>

27 Southern Association of State Highway and Transportation Officials, <http://www.sashto.org/>

28 Western Association of State Highway and Transportation Officials, <http://www.washto.org/default.asp>

29 Pacific Northwest Transportation Consortium, <http://depts.washington.edu/pactrans/>

30 Mid America Association of State Transportation Officials, <http://www.maasto.net/>

31 Oregon Division, Federal Highway Administration, <https://www.fhwa.dot.gov/ordiv/>

32 Transportation Research Board, The National Academies of Sciences, Engineering, and Medicine, <http://www.trb.org/Main/Home.aspx>

33 National Transportation Training Directors, <http://nttdonline.org/index.php>

34 *Caltrans News*, California Department of Transportation, <http://www.dot.ca.gov/ctnews/>

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- Videos
    - Develop case studies based on the scan presentations.
  - Other
    - Establish a community of practice for CT scan participants to share information about CT activities on a continuing basis.



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# Appendix A: Scan Team Contact Information

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# Appendix B: Scan Team Biographical Sketches

**AMANDA HOLLAND** (AASHTO CHAIR) is the Division Operations Manager for the Alaska Department of Transportation & Public Facilities' Administrative Services Division. She is responsible for overseeing the department's Human Resources, Workforce Planning, Procurement, Web Design, and Internal Review sections. Holland is assigned a role in several statewide strategic initiatives, specifically in the areas of organizational design, performance metrics, and engineering automation. She is a member of the American Association of State Highway and Transportation Officials' (AASHTO) Subcommittee on Personnel and Human Resources and has served as both Research Liaison and Subcommittee Chair. Holland is also on the Knowledge Management Task Force for the Transportation Research Board (TRB). She is a national presenter on leadership development and workforce planning and has spoken at various AASHTO, TRB, PACTRANS, and government communications meetings and conferences. Holland holds a bachelor's degree in industrial/organizational psychology and a master's degree in organizational leadership.

**OLIVIA P. ALEXANDER** is the Leadership and Supervisory Programs' Team Leader for the Federal Highway Administration's (FHWA) Office of Human Resources. She is responsible for providing direction and leadership over the design, development, and implementation of FHWA's Leadership and Supervisory Development Programs. Prior to assuming the Team Lead position, Alexander served as the Diversity Program Manager for the agency and collaborated with the Diversity Management Committee on the development and implementation of FHWA's Diversity and Inclusion Program. She joined the FHWA in 2003, as a training program manager for the Office of Human Resources' Talent and Development Division where she managed several training programs and revamped the Division's 'training evaluation efforts. Prior to joining the FHWA, Alexander was a senior analyst with the Department of Transportation's Office of Inspector General where she evaluated mega transit projects; co-wrote Strategic and Annual Performance Plans and cross-cutting testimony on transportation programs and operations; and developed audit training and training policies. Alexander also worked for the Government Accountability Office as an analyst in the National Security and International Affairs Division where she evaluated programs and operations of the Department of State, the Agency for International Development, and the United Nations. She holds a bachelor's degree in International Affairs from American University and a Masters of Business Administration from Johns Hopkins University.

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**VICKI ARPIN** is the Agency Human Resources Administrator for the State of Connecticut Department of Transportation, which has a workforce of approximately 3,200 employees. In this capacity, she provides overall direction for all human resources policies and programs, labor relations, occupational health and safety, payroll, benefits, recruitment, employment and records management, as well as establishing training curriculum on HR related topics and identifying staff development opportunities. She began her public service career in Boston, Massachusetts working for the U.S. Department of Labor, Office of Federal Contract Compliance Programs and continued her public service in the State of Connecticut in Affirmative Action prior to successfully working through the HR ranks to her current HR Administrator level. Arpin is the Regional Representative for Region 1 of the American Association of State Highway Transportation Officials (AASHTO) Administrative Subcommittee on Personnel and Human Resources. This committee is an active champion and promoter of HR best practices in support of talent management in state transportation agencies. She has a Master's Degree in Industrial Relations from the University of New Haven and a Bachelor's Degree in Human Services from Northeastern University. She has been an active member of the Connecticut Chapter and Eastern Region of International Public Management Association-HR (IPMA) for over twenty years, having served as a member of the Executive Board and President in both. Arpin is IPMA-CP certified.

**GREG DUNCAN** was the Assistant Chief Engineer of Operations and formerly the Director of Maintenance for the Tennessee Department of Transportation. He served on the AASHTO Subcommittee on Maintenance for 10 years, and served as the Vice-chair of the Roadway/Roadsides Technical Working Group. Among his other duties, he oversaw the reorganization of the maintenance and construction inspection staff at Tennessee DOT that included reclassification of over 2000 positions. A primary focus of the reorganization was to obtain a more effective workforce using cross training to enhance the skills of operations employees. He holds a bachelor's and master's degree in Civil Engineering from Tennessee Tech University and Auburn University, respectively.

**TOD EMERY** is the Deputy State Engineer for Statewide Operations for Arizona Department of Transportation (ADOT). In his current role he oversees seven of ADOT's ten Districts and the State Materials Group. Prior to his current capacity, Emery served as the District Engineer for Tucson District overseeing all administration, construction and operations activities within the District. Emery was the Maintenance Engineer in the Tucson District before he became the District Engineer. Prior to joining ADOT, Emery started his career with the Federal Highway Administration in the Utah Division. He participated in FHWA's Professional Development Program. He served with FHWA as an Area Engineer, and as a Program Manager for the Construction, Materials, Pavements, Research, and LTAP programs. Emery is a graduate of the University of Arizona with a B.S. degree in Civil Engineering in 2002. His is a registered Professional Engineer in the State of Arizona.

**JANE LEE** is the Chief Human Resources Officer for the Oregon Department of Transportation in Salem, Oregon. She manages the Human Resources Branch and serves on a number of committees including the Statewide HR Advisory Board, Statewide HR Directors, ODOT's Executive Team, and Central Services Management Team. She is currently the Secretary for AASHTO's Subcommittee on Personnel and Human Resources. Lee has served the Oregon Department of Transportation for 25 years in a number of assignments across the Department. Her former positions include DMV Customer Service Manager-Astoria/Tillamook, Project Manager, Mid-Willamette Area Manager, Lane County Area Manager, Alternative Contracting Delivery Manager and most recently Northwest Region Manager prior to her current assignment as Chief Human Resources Officer. She holds a Bachelor of Science in Management and Communications from Corban University.

**LEE WILKINSON** is the Director of Operations and Finance Division of Iowa Department of Transportation. Wilkinson began his Iowa DOT career in 1996 as an area maintenance manager in District 6. In 2000, he was promoted to director of the Office of Maintenance. He was named the director of the Operations and Finance Division in December 2006. Prior to coming to the department, Wilkinson worked at the Iowa Department of Personnel from 1991 to 1996 as a personnel officer. The Iowa DOT was one of the agencies he assisted while in this position. From 1989 to 1991, Wilkinson served as a management analyst in the Iowa Department of Revenue and Finance. He is a graduate of the University of Northern Iowa with a degree in public administration, with an emphasis in personnel.

**RICK SMITH (SUBJECT MATTER EXPERT)** is retired from the Georgia Department of Transportation (GDOT) with over twenty-five years of experience in the transportation industry and in training program development and delivery. His undergraduate is in civil engineering technology from the University of North Carolina-Charlotte. He has a Master in Business Administration with a concentration in project management and a Master of Science in Human Resources Management. Rick's research interests include learning transfer and knowledge management. While employed at GDOT, he was a member of the TRB KM Task Force. He served as president of the National Transportation Training Directors.



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# Appendix D: Desk Scan Results

## Literature Review

### Cross-Training in Transportation Agencies

A search of the AASHTO Subcommittee on Personnel and Human Resources<sup>35</sup> web site using the terms “cross-training” and “cross-trained” resulted in 57 documents. The results included PowerPoint presentations, Word documents, and .pdf files that contained agendas, reports, and newsletters from AASHTO committee and subcommittee activities. To narrow the search, the term “domestic scan” was paired with “cross-training.”

The sources found on the AASHTO website include:

- A PowerPoint presentation delivered at the 2014 AASHTO Subcommittee on Personnel and Human Resources Annual Meeting. On slide 32, the presenter, mentioned the use of CT as a method to develop position backup. The presenter was Michelle Tucker Chief Risk and Ethics Officer
- Example of a Satisfaction Survey (Alaska DT&PF). Question number 7 of the survey asked, “What are the three factors that would most improve your personal working situation at DOT&PF?” Response 11 of a possible 19 responses is, “More cross-training in other department areas and functions.”<sup>36</sup>
- Responses to a State of Oregon Right of Way Academy Survey (January 2009). Responding to the question “Does your department have a “Right-of -Way Academy (ROW)” or a formal training program for right of way agents?”, Maryland’s response was, “No, but we are working on a formal employee development training program which will include classes, cross-training, mentoring, etc. for the Office of Real Estate Employees.” New Hampshire responded they planned training that includes highway design employees.<sup>37</sup>
- A presentation made by Leni Oman, Director, Office of Research & Library Services, Washington State DOT to the AASHTO RAC/TRB State Representatives Annual Meeting in 2011 in which she discusses using CT as a tool to mitigate knowledge loss.<sup>38</sup>
- The agenda from the Standing Committee on Highways (SCOH) held in May of this 2013. Paul Degges, Chief Engineer, TDOT facilitated a hot-topic discussion titled “Cross-Training Personnel” in which he asks the questions, “Are state DOTs cross-training their personnel? In what areas? Have you gained any efficiencies from cross-training and/or consolidating field personnel? What lessons have been learned?”<sup>39</sup>

35 AASHTO Subcommittee on Personnel and Human Resources, American Association of State Highway and Transportation Officials, <http://ashr.transportation.org/Pages/default.aspx>

36 Example: Employee Satisfaction Survey, Alaska Department of Transportation & Public Facilities, retrieved from [ashr.transportation.org/Documents/Satisfaction%20survey%20questions%20example.docx](http://ashr.transportation.org/Documents/Satisfaction%20survey%20questions%20example.docx) - 27k - 2014-06-10

37 Right-of-Way Academy Survey, Oregon Department of Transportation, January 2009, retrieved from AASHTO: [http://search.transportation.org/search?q=cross-training&site=ashr\\_transportation\\_org&btnG=Search&output=xml\\_no\\_dtd&proxystylesheet=aashto\\_frontend&sort=date%3AD%3A%3Ad1&entqr=3&oe=UTF-8&ie=UTF-8&ud=1&getfields=\\*&filter=0](http://search.transportation.org/search?q=cross-training&site=ashr_transportation_org&btnG=Search&output=xml_no_dtd&proxystylesheet=aashto_frontend&sort=date%3AD%3A%3Ad1&entqr=3&oe=UTF-8&ie=UTF-8&ud=1&getfields=*&filter=0)

38 Oman L, Whaddaya Know? A Workshop on Managing Research Program Knowledge, July 28, 2011, retrieved from AASHTO: [http://search.transportation.org/search?q=cross-training&site=default\\_collection&btnG=Search&output=xml\\_no\\_dtd&proxystylesheet=aashto\\_frontend&sort=date:D:L:d1&entqr=3&oe=UTF-8&ie=UTF-8&ud=1&getfields=\\*&filter=0&ulang=en&ip=70.112.143.111&access=p&start=1](http://search.transportation.org/search?q=cross-training&site=default_collection&btnG=Search&output=xml_no_dtd&proxystylesheet=aashto_frontend&sort=date:D:L:d1&entqr=3&oe=UTF-8&ie=UTF-8&ud=1&getfields=*&filter=0&ulang=en&ip=70.112.143.111&access=p&start=1)

39 Standing Committee on Highways Agenda, Standing Committee on Highways, May 2013, retrieved from AASHTO: [http://search.transportation.org/search?q=cross-training&site=default\\_collection&btnG=Search&output=xml\\_no\\_dtd&proxystylesheet=aashto\\_frontend&sort=date:D:L:d1&entqr=3&oe=UTF-8&ie=UTF-8&ud=1&getfields=\\*&filter=0&ulang=en&ip=70.112.143.111&access=p&start=2](http://search.transportation.org/search?q=cross-training&site=default_collection&btnG=Search&output=xml_no_dtd&proxystylesheet=aashto_frontend&sort=date:D:L:d1&entqr=3&oe=UTF-8&ie=UTF-8&ud=1&getfields=*&filter=0&ulang=en&ip=70.112.143.111&access=p&start=2)

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## Transportation Research Board Website

A search of the TRB website revealed two publications. Each made passing mention of CT. In one of those publications, “State Transportation Agency Strategies to Address NPDES Phase II Requirements,”<sup>40</sup> the authors discussed Pennsylvania DOT’s Position Analysis Workbook as a planning tool to document CT, among other training activities (p. 62-63).

The Resources and Databases page of the TRB web site provided limited resources. Transport Research International Documentation came back with 23 articles. The oldest article is from 1974. The most recent is a journal article from 2010 titled Training Adaptive Teams<sup>41</sup>.

An article from 2003 that may be of particular interest is titled “Iowa Department of Transportation Technical Training Activities”<sup>42</sup>. The author, Chris Anderson, describes how Iowa is meeting the challenge of staff shortages by CT maintenance workers to perform construction inspection duties.

## NCHRP Publications

In NCHRP 20-68A, Scan 07-03, *Best Practices in Winter Maintenance*,<sup>43</sup> the scan team recommended CT to supplement snowplow operators (page 12).

In NCHRP Report 693, *Attracting, Recruiting, and Retaining Skilled Staff for Transportation System Operations and Management*<sup>44</sup>, the authors discuss ways for transportation agencies to recruit and retain qualified professional staff in the Systems Operation and Management area. They contend that CT is a prerequisite in multiple areas of the organization before an employee assumes a leadership role in system operations management.

## AASHTO Subcommittee on Personnel and Human Resources Website

An Articles of Interest page on this website included examples of satisfaction survey questions and a link to the online demonstration the site’s Workforce Toolkit<sup>45</sup>, developed through NCHRP Project 20-72 in 2008. A search of this toolkit identified two references to CT. Under the heading “Current Workforce Needs Scenarios,” the authors present a set of “scenarios that illustrate some of the more common and pressing workforce needs currently facing state DOTs” (p. 39). CT is identified as a resource that is likely to be useful in addressing training and recruitment as a method to compete with consultants for talent. CT is also identified as a recruitment and training resource to recruit, train, and retain qualified commercial vehicle compliance officers.

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40 Brennan K and M Venner, State Transportation Agency Strategies to Address NPDES Phase II Requirements, 2007 American Association of State Highway and Transportation Officials, Washington, DC

41 Gorman JC, NJ Cooke, PG Amazeen, Training Adaptive Teams, Human Factors, The Journal of the Human Factors and Ergonomics Society, April 2010 52:295-307

42 Anderson C, Iowa Department of Transportation Technical Training Activities, Proceedings of the 2003 Mid-Continent Transportation Research Symposium, Iowa State University, August 2003,  
<http://www.ctre.iastate.edu/pubs/midcon2003/andersontraining.pdf>

43 Best Practices in Winter Maintenance, NCHRP Project 20-68A, Scan 07-03, October 2009,  
[http://onlinepubs.trb.org/onlinepubs/nchrp/docs/nchrp20-68A\\_07-03.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/docs/nchrp20-68A_07-03.pdf)

44 Attracting, Recruiting, and Retaining Skilled Staff for Transportation System Operations and Management, NCHRP Report 693, National Cooperative Highway Research Program, Transportation Research Board of the National Academies, 2012,  
[http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp\\_rpt\\_693.pdf](http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_693.pdf)

45 Workforce Toolkit, , <http://toolkit.ashr.transportation.org/NCHRP.aspx>

## Interviews/E-Mail Communications

### ***Robert Younie PE, State Maintenance Engineer, Iowa DOT***

- Brief phone discussion and e-mail communications: Bob provided copies of job descriptions. “Cross-trained maintenance and construction positions are located in the maintenance garages and resident construction offices that are located in the six districts. The following maintenance-assigned positions do not involve CT: Equipment Operator Senior, Garage Operations Assistant - GOA, and Mechanic and Highway Maintenance Supervisor.
- “District materials staff (about 60 total staff) is marginally involved in CT with maintenance as I see it.”

### ***Robbie Weakland, Manager, Training and Education, Delaware DOT***

- E-mail communication: Robbie provided a copy of the “Professional Development Program.” It appears to describe a job rotation program (September 26).

### ***Rebecca Folz, Manager, Recruitment, Training & Development, Oregon DOT***

- E-mail communication: “We don’t have a formal ‘cross-training’ program, but we do offer job rotations, which allow employees to develop current or new skills. I have attached our policy on job rotations.” (September 29)
- Rebecca provided a copy of the State policy on Job Rotation.( State Policy: 50.015.01)

### ***Thomas Lyden PE, Administrator, Maintenance Operations, Ohio DOT***

- Effort involved Maintenance and Personnel, with Personnel supporting the program’s training aspect.
- Union culture makes it difficult to make changes to the program.
- Program is ongoing.

## Assessment

### **Limited Literature on Cross-Training the Workforce**

Within the public-sector transportation community, there is limited literature on CT the workforce. What is available does not describe objectives, key elements, or best practices or provide case study examples of dissemination.

### **Few Mature Cross-Training Programs in Public-Sector Transportation Agencies**

While the literature review and follow-ups did identify a handful of transportation agencies with current CT activities, the only formal, robust program identified is the one at Iowa DOT. It is possible that individual work units within transportation agencies have implemented CT practices and could have useful information on these practices to share (e.g., MoDOT’s Central Division). However, it is difficult to discover these without a more comprehensive survey of individual agency divisions.

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## Key Lessons and Trends for Cross-Training

If a trend exists in the limited literature, it is as DOTs begin to experience losses in personnel, attempts are made to compensate for the loss of staff by training a core work group to support the activities of another core work group. Typically, DOT management calls on maintenance workers to perform construction-related duties, such as inspection or testing.

There are insufficient documented programs in the literature to identify any key lessons or best practices

## Candidate Agencies for Inclusion in the Scan

The following transportation agencies are recommended for inclusion in the scan:

- Ohio DOT
- Massachusetts DOT (MassDOT) – recommended based on its Workforce Planning Initiative Resource Guide<sup>46</sup>
- Oregon DOT – To provide a contrasting view between CT and job shadowing. There may be solid reasons for taking one approach over the other that are influenced by culture, organization design, and other factors.
- Delaware DOT – Same as above.
- Iowa DOT

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<sup>46</sup> Resource Guide, Workforce Planning Initiative, The Commonwealth of Massachusetts, July 17, 2014, <http://www.mass.gov/anf/docs/hrd/policies/wp/wfp-resource-guide.doc>



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# Appendix E: Amplifying Questions

*Following are the amplifying questions developed by the scan team. Each scan host agency was asked to provide responses to these questions before the scan meeting and to orient its scan meeting presentation around aspects of these questions.*

## Amplifying Questions

The following questions are designed to inform the scan team about agencies with cross-training programs and the activities within an agency related to cross-training.

Four qualifying questions were presented to candidate agencies:

### Qualifying Questions

1. Does your organization cross-train? Describe
2. What activities are included in your cross-training (e.g., OJT, job shadowing, mentoring, coaching, online training, external training, internal training, job rotation, etc.)?
3. How is it administered?
  - a. Is it institutionalized through job descriptions, collective bargaining agreements, policies and procedures, desk manuals, websites, etc.?
4. Who is your point of contact on cross-training?

Agencies responding to the qualifying questions were asked to respond to the amplifying questions.

The amplifying questions are organized into five broad topic areas:

- **Design/Development:** Tasks or disciplines involved, agency factors precipitating cross-training, affected job functions, special labor groups
- **Dissemination:** Level of involvement—leadership, employees
- **Performance Measures/Management:** Program goals and measurements
- **Organizational Issues:** Political, cultural
- **Resources:** Financial, management, employee

We requested that each scan participant provide answers to each question.

### Design/Development

1. How did you determine which tasks/disciplines would be cross-trained?
2. What factors prompted the development of cross-training?
  - a. Succession planning needs (e.g., retirements/staff turnover, review of mission critical positions/roles? Please explain.
  - b. Changes in organizational structure or transition and/or consolidation of departmental roles and responsibilities? Please explain.

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- c. Gaps in performance (i.e., error rates, “trouble areas”)? Please explain.
  - d. Increasing efficiencies (i.e., leveraging resources, ease of training, enhancing decision-making through utilizing multidisciplinary teams or approaches)? Please explain.
  - e. Improving employee retention and engagement? Please explain.
  - f. Changes in the regulatory environment that dictated changes in the workforce?
  - g. Budgetary constraints? Please explain.
  - h. Other? Please explain?
3. Does your program (cross-training) focus on management or labor or both? Explain.
    - a. If applicable, what impacts did collective bargaining have on the program(s)?
    - b. What impacts, if any, did the differences have on program development?
    - c. Lessons learned?
  4. What job functions does your cross-training cover?
    - a. How do the cross-training activities differ from function to function?
    - b. What impacts, if any, did these differences have on developing cross-training?
    - c. What works(ed)? What did not worked?
    - d. What would you do differently?
  5. Does your program (cross-training) cross job functions, disciplines, or organizational divisions? If so, explain.
    - a. How did you determine which job functions, disciplines, or organizational divisions to pair/group?
  6. How do you develop the cross-training activities (e.g., contractor/consultant, or internal resources, or off the shelf purchase, etc.)?
    - a. How much did it cost?
    - b. What was the time and resource commitment to the project?

## Dissemination

7. How did you implement cross-training?
  - a. Are there current or emerging technologies that assisted in the dissemination?
  - b. How do you decide who will be part of the cross-training (target audience)?
  - c. Who is responsible for implementing cross-training (e.g., individual section heads, HR, training program, etc.)?
  - d. Is participation voluntary or mandatory? Please explain.
  - e. Is the program certification-based or personal professional development-focused? Please describe.

- f. What special training or guidance, if any, do supervisors receive?
- g. What worked? What did not work?
- h. What would you do differently?

### **Performance Measures/Management**

- 8. What were your goals when you began?
- 9. How did you measure success?
  - a. If you tied cross-training program results to department or individual performance, please explain.
  - b. How do you track participation and results of the cross-training?
  - c. Describe how you obtain feedback on the effectiveness of cross-training?
  - d. How do you evaluate the program's effectiveness? What metrics do you use?
  - e. What worked? What did not work?
  - f. What would you do differently?

### **Organizational Issues**

- 10. How has the program been received?
- 11. What are your future plans for cross-training (expansion, abolishment, status quo, etc.)?
- 12. What obstacles did you overcome in order to have a successful program?
- 13. Who is the cross-training champion/sponsor?
- 14. Is cross-training a part of your formal knowledge transfer initiative? If yes, please provide a brief description of the initiative. Who is the contact person?

### **Resources**

- 15. How much time is spent training and being trained?
- 16. How much time is spent administering cross-training?
- 17. What are the costs associated with the cross-training?
- 18. How is cross-training funded?
- 19. Is cross-training an ongoing budget expense or do you need to request funding every year?
- 20. What type of technology is used (both for administration and for training)?



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# Appendix F: Scan Participant Responses to Amplifying Questions

*This appendix was developed largely based on material submitted by scan participants. This material was selectively edited for clarity. The main report body includes extracts from this material to illustrate key scan findings.*

## California Department of Transportation (Caltrans)

**Response provided by**

**Michelle Tucker and Lori Kirkendoll, Office of Enterprise Risk Management**

**Answers to Qualifying Questions**

CT occurs daily throughout Caltrans, in both formal and informal capacities, depending on program area needs. There is a formal engineering rotation program within the Division of Engineering Services (DES), in which civil transportation engineers rotate through various engineering assignments to gain a better understanding of work throughout the division.

Another example of CT involves the Division of Transportation Planning's Field Academy, a formal program designed and dedicated to expanding the students' knowledge base and ensuring they have a thorough understanding of the division and its responsibilities.

On the other end of the spectrum, the Division of Information Technology incorporates informal CT into its daily activities among staff, enabling continuity of work when staff is out (e.g., training or illness) and contributing to a well-rounded and engaged workforce

At Caltrans CT takes the form of on-the-job training, mentoring, coaching, internal and external technical training (online or in classrooms), job rotation, and desktop manuals.

**Design/Development**

The DES Rotation Program has been in place for many years and has a formalized agenda and system developed for this training. A less-formal process allows supervisors to work with employees to determine needs, which includes reviewing core competencies and skills.

Previously, executives moved into other functional areas, which provided CT opportunities. Determining disciplines for CT can also be derived from outside influences – changes in laws or programs or political pressure to change.

The primary factors prompting CT are succession planning, career development, and having trained backups to provide seamless coverage when an employee is on vacation, on sick leave, or absent for other reasons. CT benefits an organization by building a more diversified staff with a stronger skill set and greater understanding of the jobs that are performed by their coworkers, which in turn fosters better leaders, improved teamwork, and employees with a more expansive comprehension of the work we do as a department.

CT provides for a more rounded, experienced workforce. Workers are better prepared for new assignments or opportunities.

In other cases, we offer rotations to provide job experience, as in our North Region rotation program for senior engineering and nonengineering staff, which involves employees taking over a person's position for a time. Two of our deputy district directors in the North Region are currently on 18-month rotations of each other's positions.

We offer CT within divisions and have offered it across divisional lines (e.g., DES with the Division of Maintenance's Structure Maintenance & Investigations office). We also provide staff "loans" to other Project Delivery Divisions as opportunities present themselves. This is quite limited, but it has occurred. As the name implies, DES's focus is predominantly on engineers, as it is an engineering division. However, opportunities are provided for nonengineering employees within DES when available.

We have not measured CT as a standalone training resource. It is incorporated into all of our training resources and expenditures. DES training, including Personal Services and Operating Expense dollars (including contracts), is approx. \$1.2 million. The Division of Equipment's training budget is approximately \$500,000; however, this includes all forms of training, not just CT.

Current technologies that assisted in the dissemination include inter/intranets, PCs, mobile technology, and various software.

All employees are part of CT; however, the DES rotation program is focused on Transportation Engineer (TE) civil engineers.

Each division/program is responsible for implementing CT, with the help and consultation of the Workforce Planning Office.

## Dissemination

**Performance  
Measures/  
Management**

For many programs, primary goals range from an investment in the stability and future of their workforce, to ensuring continuity in day-to-day workflow. Ultimately, our goals were to build a more-diversified staff with stronger skill sets and a greater understanding of the jobs performed by their coworkers that would, in turn, foster better leaders, improved teamwork, and employees with a more expansive comprehension of the work we do as a department.

This is a continuous program as staff changes (e.g., due to retirements, promotions, and accepting new job assignments) occur regularly. However, we do see stronger candidates with more diversified backgrounds (as a direct result of CT) competing for vacancies, and this is a definite measure of success. Improved teamwork, enhanced customer service, greater understanding of the challenges coworkers face, and staff with more diverse skills are other measures of success.

Mandatory participation to provide coverage of duties within the program is included in individual development plans and training plans.

Front-line supervisors monitor informal CT to ensure adequate coverage in their program functions. Administrators and coordinators document the performance of their respective formal CT programs, such as the Rotation Program in DES or the Field Academy in the Division of Transportation Planning.

Program effectiveness is evaluated via the Workforce Planning Unit in the Office of Enterprise Risk Management. One method of evaluation is comparing the attrition rate (consisting of transfers, retirements, and separations) at least annually. A lower attrition rate may indicate a positive retention strategy.

Another method of evaluation is reviewing the candidate pool for vacancies within the divisions and districts. Thoroughly qualified in-house candidates indicate a properly trained and robust workforce, with skill gaps that have been addressed via proper avenues.

Supervisors indicate minimal lag and maintained workload demands and performance standards with employees who have participated in CT.

If we were to do it differently, we would streamline processes and increase hiring for critical work areas.

## Organizational Issues

CT is not one size fits all. The DES Rotation Program is well-entrenched in Caltrans culture. However, it is in place to train new, less experienced engineers who were hired. As of now, the program continues, but at a reduced level. All DES management teams support CT.

Overall, our staff experiences the benefits of CT from merely allowing individuals the freedom to go on vacation without worrying whether things will be done, to the opportunities CT provides by expanding their skill set and helping them become more competitive for promotion opportunities.

Caltrans will begin a formal mentorship in October 2015. The pilot cohort will consist of 10 mentors and 10 mentees, with a program length of approximately eight months.

While CT efforts are encouraged in all districts and programs, there are challenges that come from the state's classification structure (e.g., employees wanting to CT to a classification different from their own.)

Overall, the ongoing obstacle is the ability to maintain workload demands and meet performance standards while investing the time for CT. In addition, some highly specialized and uncommon tasks have proven difficult to maintain CT levels.

## Resources

There are challenges to quantify training time; but Caltrans is working on capturing training time through its current timekeeping system and LMS.

For the Rotation Program in DES, participants are essentially training 100% of the time for the duration.

## Connecticut Department of Transportation

### Response provided by

Scott Hill, Transportation Engineering Administrator; Vicki Arpin, Human Resources Administrator

**Answers to  
Qualifying Questions**

Yes, our department has a CT program, more specifically, a rotation program between the Bridge Design Unit and the Bridge Safety Unit. We hired a lot of engineers right out of college; they were inexperienced designers with lack of field exposure and knowledge that was limited to books. We wanted to expand their field experience and gain a detailed understanding of the function and flow of bridge elements.

Some of the activities the designers participate in are:

- **Shadowing:** The engineer will observe and learn from a team leader and inspection team while they are inspecting unique structures.
- **Mentoring:** We assign engineers to a crew for a six-month period where team leaders coach them on how to inspect bridges and generate reports.
- **Online/Internal Training:** Some of the training includes the FHWA-National Highway Institute (NHI) Safety Inspection of In-Service Bridges, FHWA-NHI Bridge Inspection Refresher Training, FHWA-NHI Fracture Critical Inspection Techniques for Steel Bridges, Safety Management System Training, safety training, and confined space entry training, among others.

Our program is neither institutionalized nor part of any written job description. We have no collective bargaining agreement requirements (due to being voluntary). Our Bridge Safety & Evaluation Unit developed the scope of work with the program goals. Some of the materials needed to execute the program includes the Bridge Inspection Manual and BrM bridge management software , as well as BRI-18 Databases . The Department currently uses the Structural Management System (SMS), which is run off of Bentley's InspectTech software platform.

Our points of contact are:

Richard A. Prescott, P.E. – TE3  
Email: [Richard.Prescott@ct.gov](mailto:Richard.Prescott@ct.gov)  
Phone: (860) 594-2708

Ashley Heredia – TE1  
Email: [Ashley.Heredia@ct.gov](mailto:Ashley.Heredia@ct.gov)  
Phone: (860) 394-7225

## Design/Development

Designing and inspecting go hand in hand; designers will better understand why certain bridges are chosen for rehabilitation projects versus reconstruction.

We had a large group of employees close to retirement and a large group of new and inexperienced employees; however, there was not enough time to train the new employees and pass on the wealth of knowledge.

ConnDOT can use bridge designers as assistant inspectors should they find the need to, or in case of an emergency.

Designers would then create the project and design for work reported in the last (sometimes very old) inspection report done before project initiation. After a few inspection cycles (up to 10 years), the project would go to construction. By the time the project went to construction, the scope of work would be outdated and none of the new repair recommendations given in more up-to-date inspection reports is covered by the original design. The program will allow the designers to familiarize themselves with inspection reports, where to find them, and who to contact when developing scopes of work.

We wanted to ease the training through a more hands-on approach. We also wanted to enhance decision-making. This program will give designers a broader perspective—private as well as public sector views—and they can create professional connections

Some of the benefits the department will see include designers understanding the goals of the department as a whole; they will be able to see the big picture. In addition, there will be more connection between our units. The employee also benefits as the program will challenge their learning abilities and will keep them interested

The CT focuses on labor:

- Mainly in entry/junior level development
- It helps accelerate learning and application.
- It broadens their professional horizon.
- They also have cross-discipline exposure.

They will learn to:

- Clearly identify bridge elements
- Understand deterioration causes
- Understand what the most suitable repairs are
- Work safely during field visits

The CT job functions the designers rotate into are specific to assistant inspectors.

Bridge inspection defines all the work needed to keep bridges operational. It tells us what needs to be done to the bridge to keep it maintained, if it is functionally obsolete, and whether to post it for weight restrictions due to deterioration. This is why we decided that bridge designers should be familiar with the process.

The inspection activities occur regardless of the program. We use a consultant firm to train our employees as inspectors.

Since the activities are already occurring, the cost of the program is minimal. The department arranged a contract with the consultants for the inspection of an average of 25 structures per rotation and some negotiated extra hours of work to administer the program.

The time and resource commitment to the project:

- Two engineers – full time for six months
- Transportation project engineer – part time for six months (eight hours/week)
- Supervisor – as needed
- Consultant firm – contract to inspect the bridges for the program

## Disseminations

This is a hands-on program; it's not technology oriented. The technology is not as important to this program as much as the institutional knowledge. Our target audience is currently bridge design engineers. Bridge Safety & Evaluation, as well as the consultant firm, are responsible for disseminating the program.

Our program is currently voluntary; we did not want to expose employees to conditions outside of their comfort zone without their approval (e.g., extreme weather, heights, and working around traffic and within waterways).

The program is focused on personal professional development. While it is not certification-based, participants are presented with a certificate of completion.

No special training or guidance was needed outside of the knowledge supervisors have about the specific job training, in our case, inspection.

The program as a whole was successful. There were no dissemination show stoppers. Since it was a voluntary program, this saved us from union issues. The program is perceived as a training program. Collaboration with the consultant firm was successful. AI Engineers, Inc.<sup>47</sup> of Middletown, CT (consultant firm), was not permitted to hire our engineers or make them job offers. The scope of work was flexible and there was the ability to revise it when necessary.

Volunteers' expectation of fieldwork: designers expected to spend most of their time doing fieldwork and were unaware of the amount of work that goes into the report writing.

A critical oversight is not clearly stating the DOT's expectations, including maintaining employment with DOT after the program to help other designers, before soliciting volunteers.

The original scope of work required several revisions:

- Ten to 15 bridges a month, per participant, was not realistic, so the scope was changed to six bridges a month because of their size and complexity.

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<sup>47</sup> AI Engineers, Inc., <http://www.aiengineers.com/>

**Performance  
Measures/  
Management**

- The transportation project engineer was originally going to attend most of the inspections, but was only able to attend 25% of the inspections. This was acceptable since the consultant firm had 100% supervision.
- Employees lost their space/desk location and had no guarantee that the engineer would have the same TE3. This was revised so the participants would not lose their work area and supervisor.
- Project Planning: Employees lost their projects since the projects still had to meet design schedules.

We plan to continue to refine our processes and scope of work. We hope to meet volunteers' expectations by adding more fieldwork in the form of shadowing experienced inspection staff as well as including field trips to unique bridge structures. We also plan on having the consultants who are overseeing the participants provide each participant an evaluation on how he or she performed during the program. We also want to incorporate into the program a review of what design solutions did not work well in the field in the past and why. The ultimate goal is for the individuals returning to state bridge design to implement a train-the-trainer program, where participants become the trainers within their design unit.

The number one goal the top goals are: 1) to yield competent designers and deliver the Capital Program; 2) to improve the quality of work; 3) for designers to be able to work independently in the field; 4) for designers to be able to recognize dangerous situations, and 5) for designers to be able to identify the required maintenance and protection of traffic control for a safe work zone.

The department measures based whether or not we meet the federal metric requirements.

Performance improvement is determined from team leader feedback on individual performance, accuracy of inspection reports, the consultant firm completing and delivering the assigned bridges, and employees' long-term retention.

We currently do not have in-house metrics for the program nor pre-established performance measures to track participation and results.

We measure the effectiveness based on feedback. Currently, the designers go through an exit interview to provide input on their experience with the program

**Organizational  
Issues  
Resources**

[No answer provided]

Participants spend six months training. CT requires six months administering. Funding for CT comes from existing funds for the job.

This is a hands-on project. Besides the online training mentioned in previous questions and the databases used in inspection, there are no other types of technology.

## Iowa Department of Transportation

**Response provided by**

Lee Wilkinson, Operations and Finance Division Director; Bob Younie, State Maintenance Engineer

**Answers to  
Qualifying Questions**

CT supports the Highway Division's business strategy of cross-utilization among specific field-based classifications/positions.

**General Statements**

The following discussion of cross-utilization of staff is narrowly focused on Highway Division field-based positions in maintenance, construction, and materials. While Iowa DOT at large is interested in cross-utilization of staff, it is formalized within the Highway Division.

Cross-utilization of field-based maintenance, construction, and materials staff as well as the accompanying CT has been a part of the Highway Division's business strategy since 2003. Two key business areas benefited from cross-utilization of field-based staff: delivery of construction projects and delivery of winter operations. The need for staff in these two business areas occurs in different seasons of the year, which enables the cross-utilization of staff.

Cross-utilization of staff has allowed:

- The construction/materials group to add an average of 110,000 work hours per year by utilizing CT staff from maintenance.
- The maintenance group to add an average of 11,000 work hours per year by utilizing CT staff from construction/materials.

Maintenance staff (mostly Highway Technician positions) are CT to supplement existing Construction/Materials staff to achieve an appropriate level of oversight/inspection on state-administered construction projects. Construction/Materials staff (mostly Highway Technician and Materials Technician 3 positions) are CT to supplement existing Maintenance staff so that an appropriate level of staff is available to perform winter operations (e.g., snowplowing).

Most of the above-cited activities have been and are still in use. Situationally, each has a practical application. For example, job shadowing is useful in generating interest in a CT position; coaching and mentoring are useful in supporting an individual in a CT position.

The department CT efforts rely heavily on online and internal training. Training is provided in the area of winter operations and in construction/materials certifications.

Web-based Courses<sup>48</sup> is a web site both supervisors and employees use. It has a significant amount of information about the department's training program.

Individual supervisors are responsible for understanding the need for and monitoring their employees' progress in training and CT. Networking is done between maintenance supervisors and construction/materials supervisors so that future training and CT needs can be understood and met.

For example, if the department schedules an asphalt overlay project for next year in a certain location and there is an anticipated need for maintenance inspection help, then we train or retrain maintenance staff as needed in advance of the project. The same statement is true for construction/materials staff.

The department is working to acquire a new online training monitoring/documentation program that should be helpful in assisting staff and supervisors in monitoring training.

Two significant initiatives served to promote cross-utilization of maintenance/construction/materials staff that was done in cooperation with AFSCME through the collective bargaining process in the 2003-2005 and 2007-2009 contracts. Refer to Dissemination for more information.

Classification descriptions are written to address CT responsibilities; individual job descriptions may be written to add specific requirements when necessary.

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48 Web-based Courses, Training, Iowa Department of Transportation, [http://www.iowadot.gov/training/web\\_courses.html](http://www.iowadot.gov/training/web_courses.html)

Department CT is decentralized, based within the six individual districts.

The following individual will serve as a department point of contact:

Bob - Robert A. Younie  
Director – Office of Maintenance  
State Maintenance Engineer  
Iowa DOT  
Phone: (515) 239-1589;  
E-mail: [bob.younie@dot.iowa.gov](mailto:bob.younie@dot.iowa.gov)

**Design/Development**

The number of legislatively authorized Highway Division positions has decreased over the years. Most of them are district/field based; as of today, 1,537 of the 2014 Highway Division positions are field-based. Management thought that two key business areas would benefit from cross-utilization of field-based staff: delivery of construction projects and winter operations

**General Statement**

The driver for cross-utilization of field staff is the need to maintain a staff level and staff competence that can deliver a high level of performance in two key business areas: delivery of construction projects and winter operations.

The cross-utilization initiative has allowed maintenance employees increased access to promotional opportunities in the construction and materials areas.

Three years prior to these changes, the department consolidated the Project Delivery Division and the Maintenance Division back to its previous structure as the Highway Division.

These CT efforts have allowed us to change the culture of the department, breaking down silos that had existed for years between maintenance and construction/materials.

Maintenance operations have a net loss of about 100,000 work hours per year.

The department has not historically outsourced routine maintenance activities; however, to help maintenance crews keep up-to-date on work activities, the department has outsourced some shoulder maintenance activities that are labor intensive and is considering outsourcing some or all roadway painting, which is also labor intensive.

We shifted an average of 110,000 work hours per year from maintenance work to construction/materials work (see FY2014 –Maintenance Work –Types and Hours).

We shifted an average of 11,000 work hours per year from construction/materials work to maintenance winter operations work. (See Iowa DOT Combined Classes.)

Cross-utilization and CT have broadened employees' skill sets and provided new, increased promotional opportunities. In addition, it is likely that employee retention was improved, but no specific data are available on this point.

The number of legislatively authorized positions for the department has decreased over the years.

Cross-utilization and CT of maintenance, construction, and materials staff is an integrated process that exists in all appropriate areas and levels in the Highway Division and in the department.

Two significant events that served to promote cross-utilization of maintenance, construction, and materials field staff occurred through the collective bargaining process in the 2003-2005 and 2007-2009 contracts.

The 2003 contract allowed the department to initiate broad-based discussions with about 1,500 field-based construction, materials, and maintenance employees about the concept of their cross-utilization; a novel concept for field staff at the time, it was well-received by the majority of staff. The 6.5% pay incentive applied to cross-utilization assignments as well as to CT. Basic-level training of maintenance employees soon followed, with job shadowing and construction/materials work assignments in the summer and fall of 2003. Training, construction/materials job shadowing, and work assignments for maintenance staff continued from then to now. This provision has remained in the subsequent contracts.

**Appendix 1, Section 9**  
**From:** *2003 – 2005 Collective Bargaining Agreement between the State of Iowa and the American Federation of State, County, and Municipal Employees, Council 61 AFL-CIO*

We anticipate paying a daily inspection differential to Maintenance employees of the Highway Division and to the Construction/Materials employees. Eligible employees will receive a 6.5% of the top pay for an Equipment Operator, effective July 1, 2003, for a full shift on any day they perform work eligible for this differential, regardless of actual work performed. Time spent in training that management determines is necessary to perform construction/materials inspection work will also be eligible for the differential. The differential will not be paid for days the employee is not assigned these duties.

Management will determine the number of employees in each work unit eligible for this differential. Qualified employees within the affected work unit(s) will be selected based on seniority absent a business necessity that would dictate otherwise. If an insufficient number of employees are interested, the employer may require employees to do the work, starting with the least senior qualified employee. Permanent employees as of July 1, 2003, may notify their immediate supervisor of their preference not to participate in work eligible for these differential pays and management will make every attempt to grant this request.

The 2007 contract eliminated the maintenance classification Equipment Operator, which was the entry-level position into Maintenance and was populated with 837 employees at that time. All Equipment Operators transferred into the new classification Highway Technician Associate (HTA) at their existing pay and their existing pay grade. Two new classifications were created: Highway Technician (HT) and Highway Technician Senior (HTS), both of which had zero employees when created.

## Discussion

Iowa DOT Combined Classes has three “vision documents” from 2006 that are useful to understand department thinking in preparation for the new cross-utilization initiative that was accomplished in this contract. One of the documents is a chart that lays out information presented below.

The HTA classification is the entry-level position in Maintenance and is almost entirely composed of outside hires. The position can be used for cross-utilization purposes; the 6.6% pay differential applies to both cross-utilization and to CT.

The NT classification is maintenance-based and is two pay grades above the HTA classification. This classification is intended for cross-utilization with construction/materials. External hires filled the HT positions initially; currently HTA employees fill the HT positions.

The HTS positions can be maintenance-, construction-, or materials-based and are two pay grades above the HT classification. The HTS staff comes almost entirely through promotions of HTs. The current use of this class is:

- 12 in maintenance as bridge-repair specialists
- 43 in construction as entry-level inspectors
- 11 in materials as entry-level inspectors

2007 – 2009 Collective Bargaining Agreement between the State of Iowa and the American Federation of State, County, and Municipal Employees, Council 61 AFL-CIO

## Appendix 1, Section 14

The state and AFSCME Iowa Council 61 have agreed to the following:

<b>Classification</b>	<b>Paygrade Total</b>	<b>FTEs</b>
Construction Technician Associate	19	19
Highway Technician Associate <sup>a</sup>	20	837
Highway Technician <sup>b</sup>	22	<sup>c</sup>
Material Technician 3	22	32
Equipment Operator Senior	22	127
Highway Technician Senior <sup>b</sup>	24	<sup>c</sup>
Construction Technician	24	112
Materials Fabrication Inspector 1	24	12
Garage Operations Assistant	26	40
Construction Technician Senior	26	72
Materials Technician 4	26	34
Materials Fabrication Inspector 2	26	4
Materials Technician 5	28	14

a Previously Equipment Operators and Highway Helpers

b The State will provide individual PDQs for each position and new classification specifications for each new class. All new positions will be filled first by in-house competitive promotion and if not filled internally posted for outside applicants.

c The State will determine the number of FTEs for each classification.

Cross-utilization of positions did not affect program development. However, cross-utilization of positions did affect program delivery.

Cross-utilization affected the positions listed in the 2007 Contract shown in **Dissemination**.

Please refer to Iowa Department of Administrative Services – Human Resources Enterprise Classification Series Guidelines, which contains several classification position descriptions, which are colored to reflect maintenance, construction, and materials cross-utilization.

Each position has specific training requirements. Refer to the DOT Employee Training Academy<sup>49</sup> for additional information. Following is an example from this site for a Highway Technician. This is a maintenance-assigned position, which is cross-utilized in construction and materials. Even though this position is maintenance based, note the construction/materials CT listed (shown in bold text).

### **Training for Highway Technician Position**

Training courses required within the first 60 days of employment:

- Blood-Borne Pathogens
- New Employee Orientation

Training courses required within the first year of employment:

- Achieving Communication Effectiveness
- ADA/EEO/AA/PSH
- **Aggregate: Level I**
- **Aggregate: Level II**
- **HMA Sampler**
- **PCC: Level I**
- Valuing Diversity

Training courses required as needed:

- **Aggregate: Level II**
- **Basic Construction Survey**
- **Basic Materials**
- **Bolt Inspection**
- CDL Air Brakes
- CDL General Knowledge
- CDL Pretrip
- **Daily Diary**
- **Drilled Shaft Inspection**

<sup>49</sup> DOT Employee Training Academy, Training, Iowa Department of Transportation, <http://www.iowadot.gov/training/academy.html>

- Ethics in Transportation
- **Field Book**
- **Field Manager**
- Global Positioning Systems (GPS)
- **Grade Inspection**
- **HMA: Level I**
- **HMA Field Inspection**
- **HMA Update**
- **IM 204**
- Instructor Development
- **Introduction to Portland Cement Concrete (PCC) Paving Inspection**
- Iowa DOT Herbicide Training
- Maintenance of Traffic for Technicians
- Math
- **Monitor Administration**
- **Nuclear Gauge**
- **PCC: Level II**
- **PCC Paving Inspection**
- PCC Update
- Pesticide Applicator Certification: Test Preparation
- **Plan Reading**
- **Proflograph**
- Recognizing Roadside Weeds
- Safe Use of Basic Carpentry Tools
- Safe Use of Hand and Power Tools

- Safety Orientation
- Soil Technician
- Structure Inspection
- TCCC Bolted Connections
- Testing Self Consolidated Concrete (SCC)
- Treated Wood Inspection
- Work Zone Safety Workshop/Construction
- Work Zone Safety Workshop/Maintenance

Training courses that require certification:

- Aggregate: Level I
- Aggregate: Level II
- HMA: Level I
- HMA Sampler
- Iowa DOT Herbicide Training
- Nuclear Gauge
- PCC: Level I
- PCC: Level II
- Profilograph

The differences require a significant level of attention to detail in the:

- Development of an overall training plan (as in the department's training web site)
- Development of employee specific training plans
- Documentation of employee-specific completed training
- Monitoring of employee specific training plans

## Dissemination

The first and second items are working well; the third and fourth will improve with the application of a recently acquired new online training monitoring/documentation program that should be helpful for both staff and supervisors. Earlier acquisition of a modern online training monitoring/documentation program would have been useful and labor saving.

Department staff develops and delivers most/nearly-all CT. A few specialized training courses are consultant products.

A significant (unknown) amount of staff time was spent in delivering the program, working with the AFSCME and the employee's union, and training employees.

The department is very involved in integrating/using technology when and where appropriate. The use of web-based training has been previously mentioned.

Highway Division leadership initiated the cross-utilization discussed since over 1,000 employees from different work areas participated. Other smaller, intra-office cross-utilization efforts have been initiated at lower levels, mostly at district engineer level or at office director level.

Individual supervisors are responsible for understanding the need for and monitoring their employees' progress in training and CT. Networking is done between maintenance supervisors and construction/materials supervisors so that future training and CT needs can be understood and met. For example, if the department schedules an asphalt overlay project for next year in a certain location and there is an anticipated need for maintenance inspection help, then we train or retrain maintenance staff as needed in advance of the project. The same statement is true for construction/materials staff.

The department has recently acquired a new online training monitoring/documentation program that should be helpful in assisting staff and supervisors in the monitoring training

.The specific cross-utilization discussed here involves over 1,000 staff from different work areas and is mandatory based on position descriptions. In the case of the HTA classification, the Highway Division first sought volunteers; however, if there are not enough, it is mandatory, starting with the least-senior employee. Refer to Iowa Department of Administrative Services – Human Resources Enterprise Classification Series Guidelines<sup>50</sup>.

The maintenance, construction, and materials cross-utilization program, along with the CT program, are working well. Both programs have changed incrementally as issues/problems were identified and addressed; this is the normal process of program evolution.

## Missouri Department of Transportation

### Performance Measures/ Management

There was/is not a specific, new metric for measuring success.

The specific cross-utilization discussed here involved two key business areas that already had/have metrics; the cross-utilization program was intended to support those key business areas, at their existing level of performance.

Participation is tracked through employee time-reporting applications.

We solicit feedback from customers, partners, employees, supervisors, and managers (i.e., the normal sources).

The maintenance, construction, and materials cross-utilization program, along with the CT program, are working well from multiple perspectives: customers, partners, employees, supervisors, and managers.

The cross-utilization program and the associated CT program have changed in incremental ways as issues/problems were identified and addressed; this is the normal process of program evolution.

<sup>50</sup> Classification Series Guidelines, Human Resources, Iowa Department of Administrative Services, <https://das.iowa.gov/human-resources/classification-and-pay/classification-series-guidelines>

## Organizational Issues

The cross-utilization of maintenance, construction, and materials staff has been well-received by most parties, with the exception of some first- and second-line maintenance supervisors for their own narrowly focused reasons.

Cross-utilization of field-based maintenance, construction, and materials staff, as well as the accompanying CT, will continue to be a part of the Highway Division's business strategy; no changes are expected.

Management encourages intra-office cross-utilization efforts at district engineer level or at office director level.

The concept of cross-utilization and CT have been part of the department's culture and business plans for over 10 years, and so are ongoing without the need for a champion/sponsor.

The department does not currently have a formal knowledge-transfer program. The need for one has been identified in the department's strategic plan, and CT should be part of the program.

## Resources

At a higher level, in FY2014, 1,044 field-based maintenance employees received 49,751 hours of training (all types of training) at a cost of \$2,035,010 (\$1,949 per employee, 47.6 hours per employee). No additional funds were sought. All training is funded through the existing budget. Each office has a training budget. Training vies with other work functions for funding. This is a "local" funding allocation decision.

## Missouri Department of Transportation

### Response Provided By Answers to Qualifying Questions

Kristen Bagwill, Employee Development Manager

MoDOT has several programs in place that promote CT:

- Accelerated Professional Engineering CT (APEX)
- Maintenance Leadership Academy (MLA)
- Accelerated Leadership Development (ALD)
- Non-Maintenance safety-sensitive employees who hold commercial driver's licenses and plow snow (Non-MT SS Snow Plowing) (Snow Academy)

## Answers to Qualifying Questions

All of the following activities are included in CT: OJT, job shadowing, mentoring, coaching, online training, external training, internal training, job rotation.

Program tools:

- APEX: desk manual/information packet, (new) statewide program, customized for and administered by each district
- MLA: desk manual/information packet, statewide program, customized for and administered by each district; centralized SharePoint site to house materials, overseen by statewide team
- ALD: desk manual/information packet, statewide program, centralized SharePoint site to house materials, overseen by one program coordinator
- Non-MT SS Snow Plowing: Included in job descriptions and governed by HR policy/ procedures

Kristen Bagwill, Employee Development Manager, is the contact person.

## Design/Development

Organizational needs. With the increasing number of retirements and current high levels of first-year turnover (pay raise and organizational culture issues stemming from budget concerns), succession planning and knowledge sharing are key.

Bolder Five-Year Direction<sup>51</sup>, 2011-2013, was an organizational restructuring process that reduced staff by nearly 20%, and reorganized and reduced organizational structure, facilities, and positions. With more than 33,000 miles of roadway to maintain (along with other modes of transportation and bridges), funding is insufficient to accommodate the resources needed to maintain the system.

Employees who are aware of various areas of the business are better able to lead the organization forward, make more efficient and effective decisions that are better for the whole, and understand how the parts work together.

<sup>51</sup> MoDOT's Bolder Five-Year Direction: A Presentation to the Missouri Highways and Transportation Commission, Missouri Department of Transportation, <http://boonslick.org/wp-content/uploads/2011/06/Bolder-Five-Year-Direction-Plan.pdf>

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MoDOT has been through the necessary organizational right-sizing and restructuring; now the focus is shifting to knowledge sharing, succession planning, retention, and employee development. CT programs accomplish all of these things while creating a more streamlined, efficient, and effective organization with (subjectively) happier employees and, thus, happier customers.

MoDOT's program (CT) focuses on management and labor. MoDOT is noncollective bargaining (i.e., the union is meet and confer only).

MoDOT typically allows districts and divisions to customize for their areas, as each differs greatly in types of work performed, geography, and staffing requirements. Human Resources Employee Development is a centralized group, which oversees all formalized statewide CT programs.

APEX crosses divisions and job functions for our professional engineering staff. MLA crosses job functions within Maintenance leadership. ALD allows for job shadowing across any job function/division, based on the employee's desired career path. In addition, SS non-Maintenance employees are trained in Maintenance-based snowplowing duties.

Currently, MoDOT's largest CT programs are simplistic in that they cross-train employees with similar backgrounds (e.g., APEX and MLA). ALD is based on the individual employee's career development plan and preference. The delegation of SS non-Maintenance employees to plow snow is based on pay grade.

All CT activities are developed internally, including printing and distribution (all done in-house). Time spent is based on the program.

**Dissemination**

MoDOT uses SharePoint, which allows centralized storage and collaboration. Video conferencing allows statewide teams to confer.

We have created the programs that our workforce needs for professional development, to meet organizational needs, and that target the largest groups of our employees.

Human Resources led all efforts with the ALD, MLA and APEX being coordinated through Human Resources Employee Development (HRED). HR governs/implemented the Snow Academy. HRED governs/implemented the ALD and MLA. A statewide advisory team oversees the MLA. District HR governs APEX. District HR implemented APEX through a coordinated effort by HR and the Assistant District Engineers.

Participation is voluntary for all programs except the Snow Academy.

All are professional-development focused. Certifications are not the goal in any of these programs; they all focus on CT and better equipping our employees and our organization to do the work Missourians need and expect.

Phase 1 of the MLA focused on running existing Maintenance Superintendents, Supervisors, and Crew Leaders through the program so they:

- Received the training they may have been lacking up to that point on what is expected of them as a leader
- Were better equipped to help their employees through the program during Phase 2, which targets high-performing future leaders within Maintenance

Anyone newly hired into a Maintenance leadership position also goes through the program in Phase 2.

For all programs, leadership buy-in is vital. The Statewide Advisory Team for MLA has been a real asset in shaping, advocating for, and guiding the program. For the ALD, having one highly regarded, people-focused, trusted coordinator has

**Performance  
Measures/  
Management**

been key. For APEX, the pilot district found that it worked best if participants had their Engineer in Training (EIT) certification already, as that is a prerequisite for the PE, though it was not a requirement originally.

Snow Academy was borne out of an intense organizational restructuring and right-sizing effort, therefore, it is not a favorite among SS Non-MT employees; however, they know it is necessary. Putting together work plans annually for each program also helps us keep on track.

Professional development for employees; succession planning and creating a pipeline of big picture leaders; networking; knowledge sharing; innovation; and Being Better, Being Inclusive and Being One Team

Currently, coordinators track participation and results. SharePoint and our new LMS will assist with tracking in the future.

Participants fill out evaluations or surveys (administered through Survey Monkey). As an organization, the conversation is constantly happening around such topics as what is working, what is not, is the training what we really need, and how can we be better. We also track completion as a measure of effectiveness. Completion rates are tracked for most, and feedback from participants and coordinators is used as the primary program improvement driver.

Most programs are new. As previously mentioned, the APEX pilot district received feedback from supervisors that it made sense to establish a minimum requirement of the EIT; otherwise, districts are excited to make this happen statewide. MLA feedback has been positive to date, though some participants find it difficult to complete self-guided coursework due to workload. Snow Academy is not a favorite for some, but necessary. ALD receives high praise.

If we had it to do over, we would have more people and budgetary resources for dissemination.

**Organizational Issues**

Programs have all been well-received, with the exception of Snow Academy.

Expansion of current programs and additional programs targeting additional employee groups

MoDOT overcame obstacles that included budgetary constraints, organizational perception stemming from budget and Bolder Five-Year Direction, virtual teamwork, and creating somewhat standardized programs that work for each district.

CT champions/sponsors include Kristen Bagwill, Employee Development Manager, the entire HRED Team, the HR Team, Senior Management Team , and district contacts.

**Resources**

Time spent training and being trained varies by program and by participant in some cases.

Program administration takes much less time once the program is fully implemented and communicated throughout the organization. Time spent varies by program.

Costs associated with CT include wages, printing, and travel, as needed; they vary by program. CT is funded through the budgeted process each year in the areas mentioned previously (wages, materials/printing, and travel). CT is an ongoing budget expense.

MoDOT uses SharePoint, LMS and video conferencing both for administration and for training.

**National Institutes of Health**

**Response Provided By**

Sarah Martyn Crowell, Management Analyst

**Answers to Qualifying Questions**

The Office of Human Resources (OHR) does programmatic CT, meaning we offer CT via structured program opportunities.

Two of the programs that OHR manages focus on CT entry-level professionals to serve in administrative/management positions across NIH:

The Office of Human Resources (OHR) does programmatic CT, meaning we offer CT via structured program opportunities.

Two of the programs that OHR manages focus on CT entry-level professionals to serve in administrative/management positions across NIH:

### **Presidential Management Fellows<sup>52</sup> (PMF) Program**

Since 1985, this has been a flagship leadership-development program at the entry level for advanced-degree candidates. It is a federal-wide program, but OHR manages a special “At-Large” program for NIH where selected candidates rotate throughout the entire organization for two years, creating their own schedule of three- to four-month rotations. These rotation opportunities provide on-the-job training, exposure to senior leadership, mentoring, and more, which will be described further below. The program is tailored to assist NIH in meeting its long-term succession-planning needs.

### **Management Intern<sup>53</sup> (MI) Program**

Established in 1957, this program offers key resources, targeted training, and hands-on experience to current NIH employees interested in pursuing a career in administration and management. Similar to the PMF, the Office of Human Resources manages this program and competitively offers several NIH employees a two-year opportunity to create their own schedule for three- to four-month rotations through different administrative career fields. It also provides on-the-job training, exposure to senior leadership, mentoring, and more, which will be described below.

Four of the programs that OHR manages focus on CT HR professionals internally, depending on the level.

- **OHR Intern Program:** A yearlong OHR internship program for master’s-level graduates (previously included current students as well) that focuses on building their professional development and performance through providing three- to four-month rotations in key areas of HR. The program includes a competency-driven hiring, performance evaluation process, and a placement strategy to match the intern with a permanent job in OHR after the program.

<sup>52</sup> Presidential Management Fellows (PMF), Office of Human Resources, National Institutes of Health, <https://trainingcenter.nih.gov/intern/pmf/>

<sup>53</sup> Management Intern (MI) Program, Office of Human Resources, National Institutes of Health, <https://trainingcenter.nih.gov/intern/mi/>

- **Team Lead Development Series (TLDS):** An ongoing, quarterly development program for all 45 OHR team leads. The program offers experiential learning, professional training, and access to senior HR leadership.
- **Leadership Discovery Program (LDP):** A year-long development program for GS-9 to GS-13 employees. The program includes mentorship, leadership training, shadow experiences, and an immersion experience to enhance CT/awareness of all the critical functions of the organization.
- **The Next Generation (TNG) Program:** Alternating years with the LDP, this program selects an elite group of GS-13 and GS-14 staff who are seen as future managers and leaders. The program provides mentorship, shadow experiences, a high-level action learning project, four leadership assessments, and four leadership courses.

Activities designed for:

- PMFs/MIs
  - Mentoring
  - Training budget (can be used for internal or external training)
  - On-the-job training
  - Individual development plan
  - Job rotations
  - Multidisciplinary cohort experience
  - Access and exposure to senior leadership across NIH
  - NIH-wide projects and committees
- OHR Intern Program
  - Mentoring
  - On-the-job training
  - Job-related internal training

- Job rotations
- Individual development plan
- Multidisciplinary cohort experience
- OHR-wide project (ConnectMore Program)
- LDP
  - Mentoring
  - Leadership training (external vendor; training tailored to internal culture)
  - Multidisciplinary cohort experience
  - Immersion session with OHR managers/leaders
  - Job shadowing
- TLDS
  - Professional training (job-related management skills)
  - Knowledge sharing/experiential learning
  - Multidisciplinary cohort experience
  - Access and exposure to OHR senior leadership
- TNG
  - Mentoring
  - Job shadowing
  - Leadership training (external vendor; training tailored to internal culture)
  - Multidisciplinary cohort experience
  - Experiential learning: Trans-OHR Action Learning Project
  - Access and exposure to OHR senior leadership

Candidates for the various programs must go through an application process:

- PMF Program/MI Program
  - Competitive process
  - Position descriptions
  - Policies and procedures
  - Program Manager (OHR)
  - Senior-level cross-NIH advisory committee
- OHR Intern Program
  - Competitive process
  - Position descriptions
  - Policies and procedures
  - Program Manager (OHR)
- LDP
  - Competitive process (only certain grade levels can apply)
  - Policies and procedures
  - Program Manager (OHR)
- TLDS
  - Position title/function
  - Senior leader input
  - Policies and procedures
  - Program Manager (OHR)

- TNG
  - Competitive process (only certain grade levels can apply)
  - Policies and procedures
  - Program Manager (OHR)

The contacts for the programs are:

- PMFs/MI Program
  - John Abrams (PMF) Program Manager, OHR, Workforce Support and Development Division, NIH Training Center
  - Robert Michon (MI) Program Manager, OHR, Workforce Support and Development Division, NIH Training Center
- OHR Intern Program
  - John Grill/Lillian Amaechi, Program Manager, OHR, Office of the Director, Special Initiatives Group
- LDP/TLDS/TNG
  - Janice Gonzalez, Program Manager, OHR, Workforce Support and Development Division, Workforce Enhancement Branch

## Design/Development

### **PMF Program/MI Program**

These programs were targeted based on core administrative positions that we seek to foster and develop at NIH. Along with the Deputy Director for Management, the OHR Director, the Workforce Support and Development Division Director, the NIH Training Center Director, and the Program Managers, there is an Administrative Training Committee, which provides input and guidance as to how these programs are targeted.

### **LDP/TLDS/TNG**

All of the OHR programs are targeted by level of experience instead of tasks or discipline. This was done as part of a larger strategic development initiative, aimed at building core levels of expertise in HR. Input and buy-in was also received from the OHR Director, OHR Senior Leadership, SMEs, and the OHR Professional Development Committee, which provides representatives from each HR Division.

**PMF Program/MI Program**

Succession Management: Leadership development and building a talent pipeline for core positions

**OHR Intern Program**

Succession Management: Building a talent pipeline for core positions

**LDP**

Succession Management: Building a talent pipeline for Team Lead positions

Employee Engagement and Retention: provide entry-level and mid-level employees the opportunity to explore their leadership potential, offer new ways to invest in our organization, and feel more connected to the organization

**TLDS**

Employee Engagement and Retention: Reduce organizational stovepipes, enhance Team Lead opportunities for professional development, encourage collaboration and knowledge sharing, and increase Senior Leader access to Team Lead input

**TNG**

Succession Management: Build a talent pipeline for management and leadership positions

Employee Engagement: Reward, integrate, and acknowledge high-potential employees

All CT programs focus on management/administrative employees. Some PMF positions are hired into the new PMF-STEM track, but they are largely designated into specific jobs and not in the at-large program.

**PMF Program/MI Program**

Various Administrative and Programmatic Areas: Budget, finance, communications, management/program analysis, contracts, IT, grants, HR, and project/program management

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## **OHR Intern Program/LDP/TLDS/TNG**

HR Programmatic Areas: Recruitment, client services, staffing, systems and analytics, policy, management analysis, workforce development, employee/labor relations, benefits, and contracts/acquisitions

For the PMF, MI, and OHR Intern Program, CT activities focus on building a variety of on-the-job skills and competencies, alongside professional development activities and experiential learning opportunities.

For the LDP, TLDS, and The Next Generation, the focus is more on building leadership skills, alongside the promotion of CT through knowledge sharing and experiential learning opportunities (LDP/TNG – job shadowing and TNG also has an Trans-OHR action learning project).

All of these programs use a multidisciplinary cohort experience to foster cross-learning through building new relationships and connections.

The main difference is that participants in the PMF/MI/and OHR Intern Program gain on-the-job experience/technical skills across different disciplines/divisions, whereas participants in LDP, TLDS, and TNG gain awareness and exposure to these skills across different disciplines/divisions.

The PMF/MI/OHR Intern Programs offer opportunities throughout NIH (PMF/MI) or throughout all the OHR divisions/disciplines (OHR Intern). Participants also often come to the program with a variety of prior experience and backgrounds.

Participants in the LDP, TLDS, and TNG come from different divisions, disciplines, and functions within OHR and have the opportunity to shadow and work with leaders across the OHR organization.

**PMF Program/MI Program**

Along with the Deputy Director for Management, the OHR Director, the Workforce Support and Development Division Director, the NIH Training Center Director, and the Program Managers, an Administrative Training Committee provides input and guidance as to how these programs are structured.

**LDP/TLDS/TNG**

All the OHR programs are targeted by level of experience instead of tasks or discipline. This was done as part of a larger strategic development initiative aimed at building core levels of expertise. Further guidance on structuring these programs is/was provided by the OHR Director and OHR Senior Leadership, SMEs, and the OHR Professional Development Committee, which provides representatives from each HR Division.

**PMF Program/MI Program**

- Who designed: Programs have been around since 1985 and 1957, respectively, and have developed into the current model over the years as a collaboration between the NIH Training Center and a cross-NIH committee of senior leaders (Administrative Training Committee).
- Cost/Time and Resource Commitment
  - 0.6 FTE for Program Manager per program plus shared 0.8 of a contractor for administrative support
  - OPM recruiting fee of \$7,000 per Fellow (PMF only)
  - \$2,500 training budget for each PMF and MI, per year
  - Administrative Training Committee (23 people on committee)
  - Salary of each intern/fellow (between GS7 and GS11)

## OHR Intern Program

- Who designed: Internal SME
- Cost/Time and Resource Commitment:
  - Cost of FTEs (varies depending on grade and number in cohort)
  - Program Manager: .06 FTE

## LDP/TLDS/TNG

- Who designed: Internal SMEs; external vendor provides content
- Cost/Time and Resource Commitment: 0.8 FTE Program Manager for all three programs

## Dissemination

SharePoint and shared drives are often used for file sharing and organization in the programs and among the committees that guide the programs. Video interviews are also conducted for the PMF/MI/OHR Intern Program if/when candidates are not located in the area and cannot attend interviews in person.

For all the programs, the Program Manager is responsible for dissemination, along with the guidance of appropriate steering/advisory committees and corresponding senior leadership. This has worked well; it provides clear responsibility and leadership to ensure dissemination happens in a smooth, efficient, and consistent manner. In addition, all the programs have benefited greatly from the support and promotion of the OHR Director.

For all programs except TLDS, participation is voluntary; participants must choose to apply to the program, creating a self-selection mechanism. In the case of TLDS, participants are expected to participate if they serve in a Team Lead-equivalent role and have been nominated by their senior leadership. Exceptions are made due to important work conflicts or annual/sick leave.

All the programs are personal/professional-development focused, but they also all have a graduation component, which includes presentations or acknowledgment from senior leaders, colleagues, and peers, as well as a certificate of completion. The one exception is the TLDS program, which is ongoing, so there is no graduation or certification. However, professional development credit can be awarded to staff on an as-needed basis.

**PMF/MI Program**

Rotational supervisors receive a rotation package providing an overview of the programs, templates for implementing a rotation, and tips and considerations for structuring one.

**OHR Intern Program**

Rotational supervisors receive several documents of guidance, including principles on how to make the rotation experience successful, key experiences to consider during the rotation, and a competency-drive rotation evaluation. In addition, the Program Manager works with the rotational supervisor to establish expectations for the experience and serve as a point of contact or resource at any point during the process. Overall, this has worked well, although the Program Manager has needed to be keen to disperse rotations throughout the organization to avoid burning out exceptional rotational supervisors or areas. In addition, we have learned it is important for the Program Manager to take the initiative and reach out to Rotational Supervisors during the rotation, establish check-in points with the supervisors, and make sure that any performance feedback is delivered to the intern during the experience, not just at the end of a rotation.

**LDP and TNG**

Supervisors of employees wishing to apply to these programs must sign a consent form saying not only that they believe that the employees are a good fit for the program, but that they (the supervisors) understand the program requirements and time demands and will fully accommodate/support the employees by providing them the time/resources necessary to complete the program. Supervisors are provided information about the program before the application process via e-mail and during the OHR Managers Meeting.

**TLDS**

Originally supervisors were told about the program and asked to support their employees (i.e., by providing them the time/accommodation to participate). Since the program began in 2012, we have discovered the importance of communicating more regularly with supervisors and senior leaders so they do not lose sight of the program's purpose and have the opportunity to know more about what employees gain in each session.

### **PMF Program/MI Program**

PMF and MI programs traditionally have been used as feeder pools to develop and train staff for potentially meeting future workforce administrative management gaps and leadership roles. Both programs are founded on five pillars of success (i.e., mentorship, rotations, individual development plans, training, and performance evaluation); they are intended to help build comprehensive internships geared toward the unique development needs of each intern. By participating in Institute/Center (IC) rotations, participants work on cross-organizational and trans-disciplinary skills that expose them to the diverse work cultures of each IC while providing an opportunity to discover each IC's role in the bigger picture of NIH.

### **OHR Intern Program**

Create a talent pipeline of HR professionals who have a robust awareness of our organization and exposure to several different disciplines. Create a cohort experience that helps reduce stovepipes and increase connections across divisions. Promote retention of interns.

### **LDP**

Allow midlevel staff the opportunity to see if higher levels of leadership are for them, along with developing leadership skills. Provide an opportunity to explore leadership and to understand what it means to take on greater responsibility in OHR. Build a pipeline of talent for team lead positions.

### **TLDS**

To provide skills necessary to lead from the middle. Reduce organizational stovepipes by building better relationships among team leads across divisions and promoting knowledge sharing. Implement continuous training for the OHR team leads, leading to teams that are more productive, more customer-service oriented, and more-engaged employees.

### **TNG**

OHR leadership identified the need to create a “capacity building” leadership development program to foster retention of potential future leaders within the organization, giving them exposure to and experience in to other parts of our organization where they do not work, and providing them with the training and experience needed to fulfill mission-critical positions (potentially leadership positions).

**PMF/MI Program**

Progress (end of year one) and program completion (end of year two) surveys are completed annually. The evaluation includes both quantitative and qualitative information from the participants and analyzes that against the original desired objectives. The ATC then reviews the surveys in conjunction with the NIH Training Center to assess for possible program adjustments. The program manager for both programs also regularly checks in with participants to ensure that program objectives are on track and to provide guidance, if necessary. From there, we also look at conversion positions and, over time, where interns/fellows end up. Over time, the number of senior administrative leaders at NIH who came out of these programs shows some of its success.

**TNG/LDP/OHR Intern Program**

A program evaluation is completed at the end of each program's cohort/session. The evaluation, which includes quantitative and qualitative information from the participants and program manager, is analyzed against the original desired objectives. The program manager of all three programs also regularly checks in with the participants to ensure that program objectives are on track and to provide guidance, if necessary.

**TLDS**

A yearly evaluation of the program is completed to check in on the participants, assess desired training for the following year, and make any modifications the OHR Director and Deputy Director they feel are important to make to the program. In addition, the program underwent a comprehensive independent program review in the summer of 2014; the results were reported to the OHR director and deputy director. A number of the recommendations from that report were implemented, including realigning the program with the Workforce Support and Development Division and emphasizing the program's CT and knowledge-sharing aspects (i.e., more sessions focusing on this and fewer sessions focusing on external vendor-delivered training).

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## Organizational Issues

### **PMF Program/MI Program**

Both programs historically have had positive feedback and testimonials from program participants, while also benefiting from strong leadership support across the NIH. A recent study that interviewed senior leaders showed unanimous support for the program.

### **OHR Intern Program**

Program evaluations have shown positive results for this program. In addition, the program currently has an 80% retention rate, which is seen as a high return on investment.

### **LDP**

This program was well-received and, in its initial year, had maximum participation. Past participants continuously seek opportunities to network and knowledge-share, and OHR leadership remains supportive of the program and staff participation. In addition, after each program session, participants were open to share feedback about their experience, satisfaction, and ways that we can improve the program for future years.

### **TLDS**

The existence of this program has received positive feedback; team leads have said it makes them feel that their positions are validated and recognized. At first, some participants and their supervisors expressed concern about the time commitment, especially since it was a mandatory program. However, having continuously modified the program based on participant feedback, the group has been increasingly supportive and excited to attend upcoming sessions.

### **TNG**

The first year this program was offered (2010) it received positive feedback overall; certain aspects of the program were seen as too time-intensive (e.g., three- to four-month details) and were therefore modified for the 2014 – 2015 cohort. Thus far during the current program, participant feedback has been overwhelmingly positive. Participants are deeply engaged, as are mentors and OHR leadership. Given the limited availability of slots and its elite nature, all involved individuals understood the level of time and effort required by the program.

We are not looking at expanding any of our current programs, but we are considering offering internal HR rotations for high-performing employees. This would be outside of any programmatic content and potentially at the discretion of the employees, their supervisors, the rotational supervisors, and the senior leaders involved. Currently a TNG action-learning project is looking into this further.

### **PMF Program/MI Program**

Both programs have enjoyed long histories of success (MIP since 1957, and PMF since 1985)—and both have long since overcome obstacles to success. Strong senior leadership support within OHR and NIH has contributed to this success. Most current work in support of the programs focuses on nuanced adjustments to program goals, alignment with NIH succession plans, and attendant recruitment strategies.

### **OHR Intern Program/LDP/TLDS/TNG**

Several things were critical for each program to achieve success:

- **Senior Leadership Support**  
OHR Director, Deputy Director, and Division Directors
- **OHR Director/Deputy Director Access**  
All of these programs were in part designed and implemented by an employee who worked directly for the OHR director and deputy director. This type of direct access allowed for quicker input and a more intimate knowledge of the leadership expectations for the program. In the end, the programs likely happened much quicker than they might have otherwise occurred if the person managing them were located in another HR division.
- **Program Manager/SME Collaboration**  
One to two SME employees were dedicated to the development and dissemination of these programs. This type of focused expertise was critical to ensuring stakeholder buyin and a smooth and efficient dissemination process.

The Office of Human Resources is the overall champion/sponsor for all of these programs. More specifically:

- **PMF Program/MI Program**—These programs live in the Workforce Support and Development Division, NIH Training Center.
- **OHR Intern Program**—This is managed by staff in the Office of the Director, Special Initiatives Group.

## Resources

- LDP/TLDS/TNG—These are managed by a staff person in the Workforce Support and Development Division, Workforce Enhancement Branch.

We are currently working on a more formal knowledge transfer initiative for OHR.

Time spent training and being trained varies from program to program

- PMF Program/MI Program—two-year programs
- OHR Intern Program—10-month program
- LDP—one-year program
- TLDS—ongoing program that meets quarterly; three sessions are full days, often one session is a half day
- TNG—one-year program

Administering CT—ranges between 0.6 FTE and 0.8 FTE:

- PMF Program—0.6 FTE
- MI Program—0.6 FTE
- OHR Intern Program—0.6 FTE
- LDP/TLDS/TNG—0.8 FTE (for all three programs)

All of these programs are funded through the OHR budget, which is provided by the Office of Management. The OHR-focused programs are part of a larger Strategic Training Initiative and are calculated as part of the organization's training needs. The OHR Intern Program is an exception to this; the money for this program is part of our normal FTE costs, as it does not cost anything beyond the cost of the FTE positions.

The Office of Management specifically allocates money to OHR for the PMF At-Large Program and MI program.

### **PMF Program/MI Program**

These programs are specifically created for CT. While it is an ongoing budget expense, in difficult budget times, the numbers of interns/fellows have been reduced over the years, and the program does need to be periodically justified.

**OHR Intern Program**

The need for this program is reviewed annually, based on our budget, FTE level, and organizational capacity to support the rotations.

**LDP/TNG**

These programs alternate years. Currently we have a contract that allows these programs to continue alternating through FY2018. However, if there were a significant budget issue or reduction, these programs might halt until the financial situation improved.

**TLDS**

This program is calculated into the yearly budget. Similar to LDP/TNG, if there were a budget shortfall or issues, leadership might decide to cut external training for this program; however, the sessions/overall program could continue and instead focus on internal knowledge sharing, SME panels, and learning labs.

**PMF Program/MI Program**

A shared drive, with sandbox capability, and a SharePoint site support program collaboration and communication. Interns and fellows regularly use videoconferencing capabilities at NIH as they collaborate from a variety of locations.

**OHR Intern Program**

Currently interns can share files with one another through a shared drive; this year, SharePoint may be used. Any training is done in person and requires a basic setup (e.g., projector and PowerPoint).

**LDP**

The program manager uses SharePoint to administer the program. All training is conducted in person and requires a basic setup (e.g., projector and PowerPoint).

**TLDS**

The program manager uses SharePoint to administer the program. All training is conducted in person, with Web learning setup for remote employees and requires associated setup (e.g., projector, PowerPoint, WebEx, and conference call).

**TNG**

The program manager uses SharePoint to administer the program. Additionally, the participants use a team SharePoint site to collaborate on projects. All training is in person, requiring a basic setup (e.g., projector and PowerPoint).

# Oregon Department of Transportation

## Response Provided By

Jeffrey Labhart, Highway Division Business Manager; Jane Lee, Chief Human Resources Officer

## Answers to Qualifying Questions

### Region 4

Yes, our region does cross-train. We routinely train or move staff into positions they may have an interest in for several reasons: it adds bench strength, it is good for employee morale and increased productivity, it increases job satisfaction, it helps with succession planning, and it enhances workforce flexibility.

Our region engages in mentoring, job shadowing, coaching, online training, developmental training, job rotation, on-the-job training, and external training. Generally, the respective manager and/or an agreement administer it. The business manager maintains a database. This is a Region 4 management practice and is institutionalized locally at that level.

Contact: Region 4 Business Manager, Highway Division– Jeff Labhart

### Leadership Academies

CT is accomplished through project assignments or networking with cross-functional staff in the cohort. ODOT's workforce policy covers a variety of training methods, including developmental and rotational assignments.

Contact: Eryca McCartin, Highway Division

### Tech Center

Employees are routinely moved into positions or projects of interest to the employee or into vacancies to allow time for the employee to develop needed skills to compete for the position. Recent work is designed to cross-train key or critical positions.

We report as an agency against a performance metric that 50% of all employees should receive a minimum of 20 hours of education and training in each fiscal year related to work skills and knowledge

**Design/Development**

Contact: Jen Lara, Highway Division

**Other (includes Budget Office, Human Resources, Maintenance Trainee Program(MTP), and Graduate Engineer Program (GEP) programs)**

Employees are routinely moved into positions or projects of interest to the employee or into vacancies to allow time for the employee to develop needed skills to compete for the position. The Maintenance Trainee Program (MTP) and Graduate Engineer Program (GEP) program recruitment practices include an element of intention to seek and attract diversity candidates.

Oregon's Department of Administrative Services and ODOT policy institutionalize job rotation policies and forms. Managers can use ODOT's rotational form to document agreements with sending and receiving supervisors.

Our Collective Bargaining Agreement (CBA) with Association of Engineering Employees (AEE) covers Compensatory Time (CT) via developmental opportunities and rotational assignments for the purpose of upward mobility and job enrichment or when in the best interest of the state.

Contact: Jane Lee, CHRO, Phone: (503) 378-3408

E-mail: [jane.s.lee@odot.state.or.us](mailto:jane.s.lee@odot.state.or.us)

**Region 4**

Both management and labor have the opportunity to respond to an annual questionnaire.

Our CT covers many job functions across the region. Nothing is off the table regarding the discussion. Some examples have included training maintenance staff on construction project inspection, and training administrative staff on IT, procurement, finance, and STIP.

We really have not had a scenario that has not worked or been at least somewhat helpful.

We would do anything differently, except maybe look for more opportunities down the road.

It really comes down to discussions with the employee and the manager and understanding the needs and wants and making that fit with the organization's needs.

It all starts with the performance appraisal and asking these questions:

- What are your career interests and goals?
- What potential positions or functions you would like to take on? Are you interested in exploring rotational or developmental opportunities?
- Would you be interested in exploring a mentoring opportunity in a particular area or with a specific manager? Alternatively, would you like the opportunity for career guidance, other than mentoring?
- What other feedback/ideas/needs/questions do you have on career and leadership development opportunities in Region 4?

Almost all of our CT opportunities use internal resources, so the costs are minimal, but there is a time commitment from both parties. We generally like to commit at least six months to an opportunity.

### **Leadership Academies**

Our CT program focuses on both management and labor. Our CT covers intermodal operation job functions. Our CT crosses job functions, disciplines, and organizational divisions. Leadership Academies expects participants to be away from the office to attend the training and to complete cohort projects. The sending unit supports the employee by absorbing this commitment.

### **Tech Center**

A recent audit by our Secretary of State's office has increased attention to the opportunities for CT.

Our CT program focuses on both management and labor. Our CT covers engineering and technical positions. R4 experience is typical; other costs may include a backfill of the original position by a temporary or contracted worker.

### **Department of Motor Vehicles (DMV)**

This practice was developed and continues to be a best practice in response to management needing to balance workload across work units.

Our CT program focuses on labor

DMV Headquarters Staff, primarily vehicle and driver processing units

No longer mandatory under recent management change. DMV managers expressed a need to refocus on this important program.

Institutionalize as best practice

Yes, within DMV HQ.

Greatest need and most suited to growing employees into next positions

R4's experience is typical; other costs may include a backfill of the original position by a temporary or contracted worker.

**Other (includes Budget Office, Human Resources, MTP, and GEP programs)**

In response to declining revenue projections Oregon DOT completed a 5% reduction in staff over the past four years. This has resulted in roles merging and staff learning new tasks (i.e., survey/right of way manager versus separate units prior to the right-sizing effort).

Two drivers include projected vacancies as retirees actually retire, and less than desired Equal Employment Opportunity parity within our workforce.

The department reduced staff by 5% over the past four years and was required by the legislature to meet an 11:1 manager/employee ratio.

Both, depending on the program

Minimal; it is however encouraged by the LMCs

No job types are excluded from participation.

We need not just intermodal, but also interdivisional collaboration. It is not yet a priority to train across divisions.

Sometimes

Greatest need or risk of vacancy or diversity concerns

R4's experience is typical; other costs may include a backfill of the original position by a temporary or contracted worker.

## Dissemination

### Region 4

Getting managers to buy in, ask the questions, and do the work with employees to get the information. At any one time, between 10 and 20 staff in Region 4 are involved in CT. It really depends on the situation when it comes to how much time is spent doing CT. Sometimes it is a few hours a month, other times it is full time.

It primarily focuses on our labor staff and not management. That being said, we should probably look more at CT management.

Generally, managers create the opportunities.

All employees are expected to complete the form.

Personal development

### Leadership Academies

Participants are exposed to management team meetings across the agency and serve on work teams, which complete projects that support multiple business areas.

Separate academy offerings are designed to support development of emerging leaders and senior leadership

Academy leadership and sending managers

Voluntary; must apply to the academies

Completing the program is valued and helpful on resumes.

### Tech Center

Voluntary (manager may ask specific individuals)

Right-of-way leadership wants the certification to be an MQ for promotional opportunities; however, they have not implemented their academy program yet.

### DMV

DMV expects everyone in the unit to participate.

DMV has an expectation that everyone can back up at least one other task, so it's "semi-mandatory."

Personal development

**Performance  
Measures/  
Management**

**Other (includes Budget Office, Human Resources, MTP, and GEP programs)**

No; most use MS Excel spreadsheets to capture data.

Managers offer via e-mail or internal recruitment and/or work with individuals.

Generally, managers create the opportunities.

Participation is generally voluntary, although people are asked to help.

Personal development

Support via manager's handbook and one-on-one with HR staff. HR also maintains a manager's portal website with tools and links to best practices for workforce development.

**Region 4**

Improve/track CT bench strength

We have not directly tied CT to program results.

The business manager uses an employee matrix to track participation and interest.

Management team review; no metrics

**Leadership Academies**

Develop a pipeline of future leaders

Cohorts are known and employees "graduate," but information is not recorded in official employee files.

**Tech Center**

Respond to Secretary of State audit with results.

A new code to track these reassignments is in development to capture more accurately actual use of rotational and developmental assignments.

**DMV**

Prepare staff to promote and ensure capacity to meet performance goals.

## Organizational Issues

DMV managers track results on spreadsheets.

Change of management, some units stopped participating, goal is to keep it alive, all managers participate

### **Other (includes Budget Office, Human Resources, MTP, and GEP programs)**

Attract, retain, and develop a diverse and competent workforce

Currently there is no way to track actual performance. We know anecdotally that more opportunities are provided than are measured.

### **Region 4**

We have really just started to roll it out, but there seems to be a lot of interest and excitement around it.

Continue status quo

### **Leadership Academies**

Very popular; “getting in” is a big deal

Continue status quo

### **Tech Center**

Continue building opportunities and implement use of tracking code when it is developed to allow performance reporting.

### **DMV**

Good for manager and staff

Re-energize program and continue

### **Other (includes Budget Office, Human Resources, MTP, and GEP programs)**

Rotational and developmental assignments are used regularly across departments.

Continue adding tools (i.e., new development plan form, website improvements, and focus on competency-based performance measurement)

## Utah Department of Transportation

<b>Response Provided By</b>	Lorri Economy, Learning and Development Director
<b>Answers to Qualifying Questions</b>	<p>UDOT has a robust CT program for Transportation Technicians and Rotational Engineers. Trans Techs are trained to work in both maintenance and construction fields. UDOT's Rotational Engineer program uses CT as part of the on-the-job training learning method.</p> <p>Trans Techs are trained through UDOT's Transportation Education Program (TEP), which consists of CT, mentoring, and online training. During the first four years of employment, all Trans Techs must complete online training in English, math, and specific transportation-related skills.</p> <p>Trans Techs are trained by other, more experienced Trans Techs. Hands-on training is provided on an ongoing basis and at two events during the year. In the spring, training focuses on sampling, testing, and other skills needed during the construction season. In the fall, training focuses on snow removal and routine maintenance tasks. The program uses mentoring, coaching, and job shadowing as needed to augment the skills Trans Techs are required to master.</p> <p>The Rotational Engineer program accepts candidates seeking a PE license who have graduated from a qualified university engineering program. Rotational engineers complete four years of supervised work as an EIT at UDOT before taking the PE and other exams. The EIT experience at UDOT is designed by UDOT to provide a varied and challenging work environment.</p> <p>The TEP and Rotational Engineer programs are administered through internal policy and procedure, job descriptions, and instructional manuals.</p> <p>The point of contact for TEP is Lorri Economy, Director of Learning and Development. The point of contact for the Rotational Engineer program is Rick Murdock, UDOT Training Manager.</p>

## Design/Development

Utah's high rate of population growth drives the need for expanded lane miles. The TEP's design development is aimed at improving the efficiency of building and maintaining the state's growing transportation system in the face of increased demand and limited funding. UDOT's cross-trained workforce is more efficient and more responsive to the needs of road users since maintenance, including snow removal, is a high need in the winter months, and construction is a high need in the summer months.

The Rotational Engineers program readies newly graduated engineers to achieve a PE through a series of job placements at UDOT.

On-the-job training corresponds to engineering functions at UDOT, such as geotechnical, hydrology, project management, and materials.

At each placement, PEs mentor EITs, who are given a chance to learn skills and work on projects and programs that benefit the department. Job placements change about every six months. All EITs need to complete a mandatory placement in construction and design.

CT has benefitted the department by addressing employee turnover and budgetary constraints. UDOT has quite a few long-term employees preparing to retire. Constant CT has allowed the department to retain knowledge and skills within the workforce. CT has also allowed the maintenance and construction employees to be more efficient. While the state's population and state-owned lane miles have increased, UDOT's workforce has stayed stable while maintaining the overall quality of the transportation system.

UDOT made significant organizational changes to implement the TEP. The construction division had the T3 program, and the maintenance division had the National Institute for Certification in Engineering Technologies<sup>54</sup> and Transportation Education Program. When it was determined that maintenance and construction personnel would work in both areas, these programs were combined to form TEP. A working group was built from maintenance and construction division personnel to determine the skills needed to work in both areas. The TEP is constantly evaluated and adjusted to meet the needs of Utah's vibrant and changing transportation environment.

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<sup>54</sup> National Institute for Certification in Engineering Technologies, <http://www.nicet.org/>

The TEP was formed to anticipate the need for building and maintaining the transportation system while operating with limited funding. Looking downstream, senior leaders could see that the demand on the transportation system would continue to increase, but that budget and funding streams would continue to decrease. Additionally, inspection and maintenance workers were in short supply, so CT became a necessity. UDOT's leaders made the decision to combine the maintenance and construction work forces to do more with less, something that is often required in government.

To institute CT among construction and maintenance personnel, UDOT needed to make changes to management and labor functions within the agency. Construction engineers and maintenance engineers were combined into district engineers who manage both construction and maintenance activities within a part of a UDOT region. The construction and maintenance workforces were combined into one workforce, trained to be competent in both construction and maintenance activities.

CT at UDOT covers all of the major functions within construction and maintenance, such as construction inspection, materials testing, equipment operation, snow removal, and winter and summer road maintenance. The result of combining workforces at UDOT is that maintenance and construction divisions have worked together better than before since workers understand both specialty areas. For example, construction inspectors who now understand maintenance issues provide valuable input when transportation facilities are constructed.

UDOT sometimes faces difficulty when workers do not have the skills to succeed in both areas. However, training that is readily available helps the workers improve skills to meet the agency's needs. In hindsight, making the program voluntary, with incentives for those who developed more skills, may have been a good policy early in the development of the program.

## Dissemination

The initial startup cost for CT activities was about \$70,000. Collaborating with Salt Lake Community College<sup>55</sup> to develop math and English training modules reduced some of the initial startup costs. Overall, CT has required a huge time and resource commitment and a complete reorganization of construction and maintenance divisions. UDOT is thoroughly committed to CT.

UDOT has relied on emergent technologies that allow online training and webinars to be developed and presented. Online training has helped with statewide delivery objectives.

UDOT's central training group and regional trainers are responsible for implementing CT. Much of the training is certification-based. For example, certifications in materials testing, first aid, and CPR are required. All construction and construction working level personnel are cross-trained, and training is mandatory.

UDOT is in the process of developing training for supervisors and mentors to lead and help provide ongoing development of the TEP.

When UDOT first started the Trans Tech program, classrooms at Salt Lake Community College were used. Off-site training came with many logistical problems. Pulling large numbers of people from the workforce left many crews shorthanded. The cost of having large number of employees in hotel rooms and the use of state vehicles was expensive.

Developing web-based classes helped address the difficulties of off-site training. Trans Techs are required to take long courses in math and English. These courses can be completed by watching the class online, or with streaming video or on DVD. Each student can get a DVD of the class; DVD is the most-used method. The short courses on maintenance or construction topics are web-based classes. Math classes seem to be greatest challenge for students.

In hindsight, making the program voluntary and providing incentives for participation may have been an effective approach. Many leaders question whether voluntary participation would have worked because personnel resisted the program at first. However, now that the program has been in place since 2007, many workers are voluntarily and actively requesting to participate to be eligible for raises.

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<sup>55</sup> Salt Lake Community College, <http://www.slcc.edu/>

**Performance  
Measures/  
Management**

The original goals of the TEP were to increase efficiency, to build people, and to work together.

At the outset of developing the TEP, UDOT focused on full participation and completions as success measures. The program was and is still mandatory. CT is tied to individual performance. Employees go before a peer review panel to show competence in maintenance and construction, and training completion is required for promotions and raises from Tech I to Tech II to Tech III.

Training records are maintained online through the Salt Lake Community College's system, and in-house training is tracked via an Oracle<sup>56</sup> database. At the UDOT regional level, trainers do individual tracking on a spreadsheet.

Feedback from surveys is collected to track results of CT, and to improve the training effectiveness. The effectiveness of the program is reflected in the number of Transportation Technicians working in construction and number of employees advancing from level II to level III.

Tying raises to promotions has worked for UDOT. Personnel are advancing up the ladder because raises are tied to getting promotions. In some cases, the requirements are not clearly defined, which has led to confusion. Trainers, central training, and managers are making sure that specific requirements are articulated and that requirements are tied to specific skills and to raises.

**Organizational  
Issues**

Initially, feedback from workers was mixed—some liked the opportunities provided along with the program, others were change-sensitive and wanted to stick to the old ways. Now, many workers are self-motivated to seek out training and advancement. Seeing the program in action has convinced many workers who were initially doubtful.

All District Engineers, Construction Directors, and Maintenance Directors serve as champions. Managers actively promote TEP as a way for workers to develop personally and professionally and to contribute to the agency's success. Trans Techs need to be prepared to make important decisions that affect the longevity and function of the system. At UDOT, the "don't change" mindset has given way to an "embrace change" mindset as skill building and CT are recognized as intrinsic to our function as an agency.

<sup>56</sup> Oracle. <http://www.oracle.com/index.html>

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## Resources

The time investment in CT is substantial. The program has been in existence for four years. Leaders believe employees spend about 10% of their time on the TEP.

Full-time staff help administer the TEP. UDOT has six full-time regional trainers: three in maintenance, two in construction, and one in project development.

CT costs vary from year to year. For the Salt Lake Community College course modules, the cost is \$50,000 to \$90,000 annually, depending on the number of students. Seven FTE employees work at the central level, and each of the four UDOT regions have at least one trainer.

The CT is funded with in-house training funds: state-funded maintenance dollars. CT is an ongoing budget expense that is requested and approved annually.

For training, UDOT uses the following technologies: eLearning, web connect, DVD, online instruction, instructor-led instruction, tablets, the Canvas LMS, Adobe Connect<sup>57</sup>, streaming video, DVD, PowerPoint, and classroom training. For administration, UDOT uses the Canvas LMS, Adobe Connect, and database tracking.

## Virginia Department of Transportation

### Response Provided By:

Emily Elliott, Human Resources and Training Division  
Administrator; Bob Pettit, Staunton District Training Manager

### Answers to Qualifying Questions

At VDOT, CT occurs in a variety of means, from locally provided task-based training to more formal programs designed to introduce employees to functional areas and experiences outside of their day-to-day responsibilities.

Activities included in CT will vary depending on the situation. For example, a supervisor who is seeking to train a second employee in a particular task may focus solely on having the employee train another employee on the task, equating to a form of on-the-job training and shadowing. In more established programs, job rotation, mentoring, coaching, online training, and training are CT activities provided by external resources. Acting assignments when a position is vacant is also another tool management uses to provide development and CT opportunities for staff.

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<sup>57</sup> Adobe Connect, Adobe Systems Incorporated, <http://www.adobe.com/products/adobeconnect.html>

**Design/Development**

Administration varies based on the situation. For locally provided programs (e.g., narrow focus and task-based), development assignments are captured on an employee work profile, which provides the employee and supervisor a means to formally document expectations and desired outcomes. Programs that are more formal typically have internal guidance documents that will describe the program; the intended audience; eligibility criteria, if any; timeframes; and any other program-related details. Typically, this information is communicated through a variety of means (e.g., email or meetings) and oftentimes is posted on internally available team sites or internal web pages.

The point of contact on CT varies by program or situation. Local training managers are key resources for supervisors and employees who are interested in providing or participating in any type of CT event.

Programs that are more formal will have a designated lead, usually within the agency's Learning Center (training staff).

Design and development vary by the situation. Supervisors identify locally provided CT needs based on a variety of factors (noted below in next answer). The same is applicable looking at the agency at a macro level.

Specific agency factors that have prompted the need for CT are many and vary at the micro and macro levels within the organization. At a local or micro level, supervisors are focused on addressing needs for continuity of operations, along with improving employee retention, engagement, and succession planning. At a macro or agency level, succession planning and long-term needs for talent that is ready to perform current work and future work demands are driving factors for CT programs.

Executive leadership remains focused on improving organization efficiencies through the evaluation and realignment of programs and people. This has included the consolidation of divisions, impacting programs and people. Another key executive focus is ensuring that decision-makers are better equipped to make and understand the impact of decisions across programs and processes.

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Agency performance metrics also provide a means for identifying and targeting areas of concern. These areas of deficiencies are explored to identify if processes or training needs are related barriers to achieving desired outcomes and performance targets.

Local and agency-wide programs are focused on both individual contributors and management positions. VDOT is not affected by collective bargaining agreements.

The specific job functions covered by CT will vary by the situation. Examples of CT provided in the Experimental Learning Assignment have included job tasks associated with equipment repair, maintenance program supervision, and contract monitoring. Examples within the Executive Rotation Program have included working on special projects involving IT systems development and dissemination of General Assembly-approved legislation. The amount of time being allocated for CT has a significant impact on the types of assignments provided.

Assignments provided depend on the situation. Local, task-based CT may occur within a work team or work unit. Programs that are more formal tend to provide CT opportunities in other job functions, disciplines, or organizational work units. Decisions are grounded in business needs, but also with employee interest and development needs in mind.

Internal resources are used to develop CT opportunities and programs that are more formal. Staff such as training managers and learning consultants conduct online research and participate in professional organizations to stay abreast of best practices and new ideas that, in turn, can be incorporated into agency operations. Cost and resource commitments are an area of weakness and have not been sufficiently documented to reflect all program costs and resources needed to implement programs.

**Dissemination**

Very little to no technology is used to support and document CT activities. Employees can capture training and learning events in their learning records, although these have historically been classroom-based training events, online events, or attendance at a conference or workshop. CT identified as part of a learning plan can be documented on employees' work plans, which are used as part of the agency's performance management planning and evaluation process.

Targeted audiences for CT will vary by the situation, as will who is responsible for dissemination. Locally initiated CT events are often supervisor- or employee-driven; executives often sponsor programs that are more formal, with training and learning consultants as program leads. Participation in CT activities has historically been voluntary and focused on personal professional development.

Training and guidance to supervisors will vary; however, in general, supervisors are encouraged to provide CT opportunities and focus on the short- and long-term growth and development needs of the next generation of workers and leaders. Executives are regularly reminded through leadership meetings that each is responsible for growing employees for future jobs.

**Performance Measures/  
Management**

Goals have been identified through business needs analysis. As previously stated, goals have included a need for continuity of operations and improving employee retention, engagement, and succession planning.

Success measures vary, but include completion of the CT assignment and feedback from those directly involved. Feedback is sought informally and formally through discussion and simple assessment tools.

A gap in program dissemination is the lack of metrics clearly tied to established and communicated goals. We have considered various metrics, such as retention rates and number of qualified candidates in applicant pools who are talent-ready to accept positions; however, to date, no formal metric has been identified within the agency.

## Organizational Issues

CT programs are well-received. However, managers are hesitant due to concerns about workload and keeping day-to-day operations running while an employee is learning a new task or is on a rotation assignment outside of the work unit. We like to refer to this as “keeping the lights green” while also trying to support employee growth and development, which, in turn, should have a positive impact on business operations and overall agency performance. To counter these concerns, we try to promote success stories and call on those with successful experiences to champion opportunities for others to be cross-trained.

Issues VDOT has identified include continued growth, more formalized program dissemination across the organization, and the dissemination of a technology-based solution that can better monitor and track CT opportunities that employees have participation in during their employment with the agency.

Funding and resources to implement a technology-based solution. HR & Learning employees are also mindful that a change in administration occurs every four years. With each change in executive leadership, there can be a change in support for CT programs. We are also being mindful that any formal program must be simple and flexible to meet needs.

Our champions for CT are at the very top of the organization: the Commissioner and Chief Deputy (both appointed positions) and Chief Engineer. However, management at many levels in the organization is equally supportive of CT programs, and employees (especially those who are new to the organization, including younger employees) are demanding that these opportunities be provided to them.

Communities of practice, lessons learned, and an extensive research and online library are approaches used for knowledge transfer. CT can play an integral role in knowledge transfer, but we do not have a formal program established just for this purpose.

**Resources**

Training hours recorded in the agency's LMS show that 143,843 hours of training occurred in a 12-month period ending February 28, 2015. A total of 988 employees or 13.8% of agency employees received 40 or more hours of instruction. The average training delivered per capita equated to 20.1 hours per employee. In addition, we found that 866 employees (12.1%) have no formal training recorded in the same period. These records are not reflective of CT opportunities.

We do not have sufficient records to report the amount of administrative costs in time or funding spent on CT.

CT activities are funded through existing operational and administrative budgets. No additional funds have been identified or targeted for most CT activities. Programs that are more formal may have funding associated with the job-rotation activities to cover any travel, meals, or lodging needs.

As a side note, VDOT has a Core Development Program targeted for entry-level engineers (and some business areas), whereas associates are brought on board for a two-year orientation and rotation through various program areas. The program has designated agency funds to cover all program costs. This has been a longstanding program to introduce engineers into the organization across functional program areas.

All funding allocations are made annually.

As previously noted, technological support is limited for capturing and reporting on CT activities and related programs. VDOT's LMS is provided through Meridian Knowledge Solutions.

