NCRHP 20-68A – US Domestic Scan Program

13-01 Advances in Developing a Cross-Trained Workforce: Summary Report

Prepared by: Rick A. Smith, SPHR for Arora & Associates, P.C.

April 13, 2015

# Table of Contents

[Table of Contents 1](#_Toc375252343)

[Overview 2](#_Toc375252344)

[Summary of Initial Findings 2](#_Toc375252345)

[Recommendations 8](#_Toc375252346)

[Dissemination Actions 10](#_Toc375252347)

[Appendix A: Scan Team Members 13](#_Toc375252348)

# Overview

Project 13-01 “Advances in Developing a Cross-Trained Workforce” was conducted under the NCHRP 20-68A US Domestic Scan Program. The purpose of this scan was to identify and document cross-training programs and the conditions under which each is applicable/best suited. Examples of successful cross-training programs, position descriptions, and implementation strategies were collected. The scan team surveyed maintenance engineers, construction engineers and operations personnel and management.

A scan team representing six state Departments of Transportation (DOTs) and one United States Department of Transportation (USDOT) Administration was formed to guide the scan and develop findings, recommendations and dissemination actions. The scan team was chaired by Amanda Holland, Division Operations Manager, Administrative Services Division, Alaska DOT&PF. Appendix A provides a list of the scan team members.

A four-day scan meeting was held in San Diego, California from March 23-26, 2015. During the first three days of the meeting, the scan team heard presentations from nine state Departments of Transportation (CalTrans, Connecticut, Iowa, Missouri, Ohio, Oregon, Tennessee, Utah, and Virginia) and the National Institutes of Health. On the final day of the meeting, members of the scan team discussed what they had learned and developed a synthesis of findings and recommendations.

This report presents a high level summary of the scan team’s initial findings, recommendations and action items for dissemination of the scan results and advancing the state of cross-training practices at transportation agencies.

# Summary of Initial Findings

Findings fall into three categories:

1. General Findings – what cross-training means to departments of transportation and the natural considerations of cross-training in DOTs, i.e. Business Need, Employee Needs, Methods, and Considerations
2. Conclusions and Recommendations
3. Dissemination Strategies

## General Findings

### Definitions of Cross-training

Cross-training involves teaching an employee hired to perform one job function the skills required to perform other job functions. Additionally, cross-training is the broadening of employee knowledge to allow organizations to meet emerging needs effectively, efficiently, and with limited resources.

Employees involved in cross-training programs become skilled at tasks outside the usual parameters of their jobs and thus become greater assets for the department while gaining knowledge and skills that benefit them personally.

Cross-training is an overarching term that is often used interchangeably with job shadowing and rotation. When used at the management level, job shadowing is an inexpensive approach to cross-training new managers. Job rotation in state DOTs is primarily used to train new engineers. Some states, however, use a type of rotation program for entry level and middle managers.

Considering that cross-training is the broadening of employee knowledge, the Scan team views job shadowing and job rotation as forms of formal cross-training

### Context for Cross-training

Several factors are creating the imperative for DOTs to consider new approaches to training and utilizing their employees. First, many DOTs have been facing losses of their most experienced staff, and there are a growing number of DOT employees eligible for retirement. In addition, 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 DOTs are constantly losing valuable employee expertise. If not managed in a proactive fashion, this loss of experience and know-how can impede organizational efficiency and effectiveness.

A second important factor driving interest in cross-training is the changing levels of funding available to DOTs. Levels of funding are determined at the state and national levels. States are already seeing cuts to state level funding due to increasingly more fuel efficient automobiles and the changing travel patterns of the motoring public. At the Federal level, funding is reduced in part due to the politics of the day.

Finally, like most organizations, DOTs are seeing an increasingly competitive environment as it relates to the pool of skilled workers.

### Value of Cross-training

In departments of transportation, the benefits of cross-training are clear. Workforce transition and the reduction in funding are creating 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 cross-training to navigate these challenges, foster innovation and enhance organizational efficiency and effectiveness.

Dissemination of Scan results could benefit agencies by providing examples of how DOT workforces in other agencies have been made more cost efficient, technically proficient, and able to adapt to changing conditions.

### Business Need

The scan team found there must be a business need if cross-training is to be successful. The need could be out of financial necessity; perhaps a department must reduce costs or delay employee salary increases. One state DOT district engineer implemented a semi-formal cross training to raise employee morale in the face of a long term freeze on salary increases. The following are categories and findings the Team identified as possible justifications for cross-training.

#### Business Case

1. Participants – more knowledge, engagement, retention
2. Employees gain more knowledge of the organization and the responsibilities of other positions
3. DOTs want to engage their employees
4. Cross-training is seen as a tool to retain employees
5. Potential cost savings
6. Employee development
7. Effective tool to allow us to meet emerging needs w/o growing size of staff.
8. Continuity, redundancy
9. Knowledge transfer
10. Resource utilization – staffing

#### Executive Cross-training

At the executive level, cross training is more likely to be informal than what is found in a maintenance-construction combination. DOTS primarily use job shadowing and academies. At least one rotation type program was identified. The program involves senior managers in the Districts rotating through the central office.

1. Job shadowing for senior managers hard to do because of time commitment; can be used as growth for subordinates
2. MODOT uses a maintenance leadership academy
3. Leadership development programs are beneficial to state DOTs
4. VDOT developed an Executive Leadership Rotation Program designed to help executives “walk in each other’s shoes.”
5. Rotational programs at the executive level help communication and understanding within an agency
6. District engineers rotate through central office

#### Combined Maintenance and Construction

Without question the most common cross training efforts among the states participating in the Scan involves Maintenance and Construction. State DOTs that are seeking ways to maintain personnel levels and deliver an acceptable level of services have determined Maintenance and Construction functions can be fused together. One scan participant referred to the combination as a “gateway combination”.

It takes significant work however. The scan team identified the following practices associated with merging the Maintenance and Construction functions:

1. Involves reclassification of positions
2. Leads to revised career ladders
3. Success hinges on two-way communication up and down the chain of command
4. Implementation committee
5. Most states have cross-trained/combined Maintenance and Construction in order to address winter operations and construction operations costs.
6. Tennessee combined all construction and maintenance EEs into three classifications.
7. Benefits the organization by augmenting construction/maintenance forces with available staff

#### Performance Measures

Scan members expressed concern for the lack of documented performance measures and metric. Although some of the presenting states discussed performance measures, they were qualitative in nature and primarily anecdotal.

1. Ohio DOT measures successes in a variety of methods. One measure of success is a reduction in construction inspection cost.
2. Connecticut DOT measure of success is based on whether or not it meets the Federal Metric Requirements.
3. VDOT measures success by completion of the cross-training assignment and feedback from those directly involved.

#### Budget/Funding

1. Savings were used for construction activities
2. Reinvestment opportunities – infrastructure

### Employee Need

It is clear from the presentations delivered during the meeting, organizations benefit from the cross-training. For example, DOTs benefit from a more flexible workforce and a more engaged workforce. The Scan Team found that employees benefit both personally and professionally. The following are categories and findings around the concept of employee needs related to the design and implementation of cross-training.

#### Learning Styles

1. Cross training should look to diversity of ability (literacy, gender and ethnic background and other protected classes).
2. Accommodation of all learning styles and abilities
3. Adult learning theories
4. Kolb training knowledge used to develop programs
5. Understanding your customers’ needs/wants is important at the beginning of design
6. Universal use of leadership theories across the organization
7. Kolb’ Experiential Learning Theory & learning styles indicator is relevant to cross training, job shadowing, and OJT
8. CalTrans knowledge transfer pyramid
9. Exposure and experience
10. Experiential Learning

#### Target Audience

1. Positions with only one incumbent
2. Owners of informal processes
3. Self-directed employees
4. Cross utilization of staff positions with similar skill sets such as maintenance and construction

#### Millennials – Next Generation

1. Multi-generational environment
2. Needs to be non-traditional; innovative
3. Reverse mentoring; reverse cross training
4. Short duration/delivery programs
5. Millennials pose new opportunities and potential problems in organizations.
6. Millennials are a key consideration in the development of cross-training and other similar initiatives
7. There are generational gaps the need to be considered

#### Champion

1. Formal cross-training programs tend to have a designated program manager
2. Leadership boosters
3. Must have a champion to empower cross training
4. Cross-training programs require leadership at all levels to implement. There must be commitment, teamwork and staff communication top to bottom

#### Change Management

1. Communication
2. Show/communicate immediate benefits
3. Show early successes

#### Methods

There are numerous methods available for a DOT to design and implements cross-training. The following are categories and findings the Team identified as possible models and methodologies for cross-training.

#### Voluntary-Mandatory

1. There are voluntary and non-voluntary programs
2. Different outcomes with mandatory vs. non mandatory rotation program. Example: More resistance from employees with mandatory

#### Rotation

1. Several state DOTs have rotational engineering programs
2. Length of rotations vary from six months to two years
3. Right-of-Way Rotations – CTDOT after candidates rotate through the four sections they are finding that employees work better across the sections

#### Education

1. Require GED for entry level positions
2. Training delivered via community college
3. Partner with community college
4. Tennessee has educational leave
5. Utah incorporated internal training w/ community colleges to develop tech training programs

#### Program Design Elements

* 1. Action learning projects
  2. Academies
  3. Technical curriculum/hard skills
  4. Soft skills
  5. Knowledge maps
  6. Competitive cross-training programs.

### Considerations

Beyond the organization, the employee and design aspects of cross-training are other considerations such as what role does Human Resources play and how big of a role does technology play. The following are categories and findings the Team identified as key considerations for cross-training.

#### Union-Non-union

* 1. One of the key considerations is whether the DOT is a unionized or non-unionized workforce. A different approach to designing and implementing cross-training in a unionized work place will be required than that of a non-unionized work place.
  2. States with collective bargaining units have challenges with job classifications related to cross-training initiatives.

#### HR Touch Points

* 1. Ohio administers math, reading and behavior assessment during hiring process
  2. Compensation and class issues often prevent use of cross-training to the maximum extent possible
  3. Need to get job classifications worked out first before moving forward with construction maintenance blended work staff
  4. Temporary overlap of employees allow the opportunity to job share or cross train
  5. Ohio performs personality tests on potential new hires during the recruitment process

#### Technology

* 1. Cross-training can be successful with or without technology
  2. Personality testing helps identify good fit candidates
  3. SharePoint is useful as a gathering point for training
  4. Computer access @ all levels of the organization

#### Cultural Factors

* 1. Cultural factors should be taken into account early in the decision-making process for implementing cross-training. Cross training can add value to any organization by building a culture of learning, innovation and collaboration.
  2. A state’s cultural identity (social, political, religious) seems to factor into training output and terms.

#### Budget/Funding

1. Partnerships with stakeholders – non-tangible
2. Higher budget/time constraining training programs can be used in alternate years (NIH example)
3. Funding for cross training varies; programs can be no cost, minimal, or run into the $100K range.
4. Developing cross-training programs requires capital and personnel resource investment

## Conclusions

Three categories of conclusions were developed by the scan team:

* Conclusions addressing How successful cross-training programs can be developed
* Conclusions directed at Who cross-training is intended
* Conclusions that describe Why DOTs should adopt cross-training as a solution to a number of challenges

### HOW

How state DOTs develop and implement cross-training is a function of many organizational factors including culture, whether the state is a right to work state or a union state, and even the history of the organization. The following is a list of these factors that can be addressed:

* Consider using adult learning theories, learning styles and barriers to learning (Malcom Knowles) when designing curriculum and in cross-training program design.
* Use internal resources/SMEs.
* Tailor cross-training to meet predetermined goals and objectives.
* Cross-training programs can be adopted from similar organizations if the program is adaptable to the specific needs of the Department; one size does not fit all.
* Both voluntary and mandatory programs have value and may be best choice depending on business case/need.
* It is possible to implement cross-training in different environments. For example, a third of the states that presented at the meeting are unionized. The National Institutes for Health and remaining states are not.

### WHO

Participant centered training programs are highly successful and organizationally useful, and they benefit the individual employees as well. While cross-training programs do not guarantee future employment or job advancement, they can guarantee more exposure, experience, and preparation causing an employee to be more competitive. Managers are sensitive to this potential misperception. Therefore, they address it in communications regarding the program.

Not just for engineers was a common observation over the course of the Scan meeting. While many programs highlighted during the week were engineer rotation programs, the group learned other functions can and do benefit from cross-training.

The Scan Team concluded successful cross-training efforts require:

* Agency commitment
* Senior leader support is an essential element
* Strong leadership (competent & forward thinking) is needed
* A positive tone at the top is important and sets the stage for success
  + A champion
  + An action plan vetted at all levels including employees(when possible).
  + Employee involvement

### WHY

The “Why” question addresses the benefits of cross-training for an organization.

* Cross-training can be used to consolidate resources
* Cross-training develops person thereby improving agency
* Cross-training programs should be driven by a business need; don’t do it just to do it
* Cross-training leverages organizational talent. Business cases vary but if they are clearly designed at onset, it will be easier to develop & implement performance measures.

## Recommendations

The scan team analyzed its finding and conclusions and developed the following recommendations:

1. Consider informal cross training options.
2. Select mentors or coaches who will be used in cross-training programs carefully. Once selected provide training to ensure they have the necessary knowledge to serve as mentors or coaches.
3. Seek out informal cross-training initiatives, recognize that they exist, offer support. Do not however intervene.
4. Agencies should document/recognize cross training that is occurring
5. Develop performance metrics to show the value of these programs.
6. Embrace generational diversity . . . Not as the problem to be solved, but as part of the solution, aka knowledge transfer (both directions) & partnership.
7. Let informal remain informal and recognize the value: make sure DOTs don’t try to formalize as they delve into these – usually they are effective because they are informal.
8. Evaluate cross-training programs periodically to determine if they meet the needs of the department-rework details if necessary
9. Align cross training programs with organizational mission, vision, goals, and needs

This scan is the first formal attempt to identify the extent to which state DOTs are using cross-training to address the challenges of a quickly changing transportation work place. State DOTS would benefit from an expanded investigation of cross training.

Initially the scan team had not solidified its definition of cross-training. It became apparent from the states’ presentations that job rotations, OJT and job shadowing all fall under the umbrella of cross-training. DOTs would benefit from a survey of their membership to determine the existence of other DOTs that are operating OJT, job shadowing or rotation programs.

# Dissemination Actions

The scan team identified a number of specific actions for moving forward on recommendations for disseminating results of the scan. These actions are summarized below, though it should be noted that many are still being discussed and refined.

## Presentations

### TRB

* TRB Annual Meeting
  + Education and Training Committee
  + Knowledge Management Task Force

### AASHTO

* AASHTO Annual Meeting (November 2016, Boston)
  + Lead team members – Lee Wilkinson/Vicki Arpin
* AASHTO Annual Subcommittee on HR Meeting (May 2015)
  + Lead team member: Amanda Holland, Chair to speak about cross-training
* AASHTO Annual Standing Committee on Finance Meeting (September 2015)
  + Lead team member: Lee Wilkinson
* AASHTO Annual Standing Committee on Highways Meeting
  + Lead team member:
* AASHTO Annual Standing Committee on Maintenance (July 2015)
  + Lead team member:
* Regional AASHTO meetings (Summer, 2014)
  + WASHTO (July 19-22, 2015, Boise)
    - Lead team member: Amanda Campbell, Chair
  + MAASTO (August 2015)
  + NASTO (June 2014 - Portsmouth)
* AASHTO website - Workforce toolkit – Upload presentations, documents (Lead team member: Amanda Holland, Chair)

### DOT Executive Team Presentations

* Exec Team, CT DOT
* Exec Team, OR DOT
* Exec Team, AK DOT
* Exec Team, IA DOT
* Exec Team, TN DOT
* Arizona DOT – informally with Commissioner John Halikowski

### Other

* National Transportation Training Directors Meeting (October 2015, Salt Lake City, Lead team member: Rick Smith)
* International Public Managers Association Meeting (April 2016, Lead team member: Vicki Arpin)
* PACTRANS – UTC (Oct 16, 2015, Lead team member: Amanda Holland, Chair)

## Webinars

* National Transportation Training Directors (2015, Lead team member: Rick Smith)
* TRB Webinar (or NHI) (Lead team member: Amanda Holland, Chair)

## Articles

* Article on Cross-training for Connecticut DOT Employee Newsletter
* Article on Cross-training for Oregon DOT Employee Newsletter
* Article on Cross-training for Journals/Magazines i.e. Organizational Psychology, Society of Human Resources, International Public Managers Association

## Videos

* Cross-training: DOT Case Studies (Lead team member: Jane Lee
* YouTube video montage (VA video, commissioner-TN)

## Cross-training Resource Development/Research Initiatives

* Develop case studies based on the scan presentations.
* Scope and initiate a research effort to assess cost savings and increased productivity resulting from cross-training.

# Appendix A: Scan Team Members

Amanda Holland ***– Chair***

Division Operations Manager

Administrative Services Division

Alaska DOT&PF

Olivia P. Alexander

Team Leader, Supervisory and Leadership Team, Talent Development Division

FHWA, Office of Human Resources

Anne “Vicki” Arpin

Agency Human Resources Administrator

Connecticut Department of Transportation

Greg Duncan, P.E.

Assistant Chief Engineer for Operations

Tennessee Department of Transportation

Todd A. Emery, P.E.

Deputy State Engineer, Statewide Operations

Arizona Department of Transportation

Jane Lee

Chief, HR Officer

Human Resources

Central Services Division

Oregon Department of Transportation,

Lee Wilkinson

Director, Operations and Finance Division

Iowa Department of Transportation

Rick A. Smith, SPHR - (SME)