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**MARYLAND DEPARTMENT OF TRANSPORTATION  
STATE HIGHWAY ADMINISTRATION**

**RESEARCH REPORT**

**EVALUATING MDOT SHA'S FACILITY MAINTENANCE  
TECHNICIAN'S (FMT) TRAINING PROGRAM**

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<b>16. Abstract</b> This project evaluates the Maryland Department of Transportation State Highway Administration's (MDOT SHA) Facility Maintenance Technician (FMT) training program, aiming to strengthen workforce capabilities and improve retention. The project involved reviewing national best practices for training non-supervisory maintenance personnel, conducting an in-depth analysis of MDOT SHA's existing training program, and surveying 146 FMTs and 35 trainers to assess job satisfaction and perceptions of training effectiveness. Key strengths identified in MDOT SHA's program include structured certification pathways, rigorous safety training standards, and hybrid instructional methods. Nevertheless, areas for improvement were noted, such as limited hands-on training opportunities, outdated instructional materials, inconsistent scheduling practices, unclear career advancement routes, and communication challenges. Recommendations proposed by this project encompass modernizing training resources, enhancing practical and field-based learning opportunities, streamlining certification procedures, clarifying career progression, strengthening internal communications, and increasing instructional support for trainers. Implementing these improvements will enhance job satisfaction, workforce retention, skill development, and ultimately support a safer, more reliable, and resilient transportation system in Maryland.			
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## **Executive Summary**

The Facility Maintenance Technician (FMT) workforce at the Maryland Department of Transportation State Highway Administration (MDOT SHA) plays a critical role in maintaining Maryland's transportation infrastructure, including roads, tunnels, and operational facilities. To equip these essential personnel adequately for the physical and technical demands of their roles, MDOT SHA has implemented a structured training and certification program. However, increasing turnover rates and employee feedback have prompted a comprehensive evaluation of this program to enhance workforce development, job satisfaction, and employee retention.

This study evaluated the current FMT training program at MDOT SHA using a comprehensive, multi-faceted approach. Initially, national practices for training non-supervisory-level maintenance employees were reviewed using information collected through AASHTO information requests, a TRB survey, and extensive online research. Findings revealed substantial variation among state programs in length, content, and delivery methods, yet consistent emphasis on core areas such as safety, CDL preparation, equipment operation, winter operations, and career development.

Subsequently, MDOT SHA's training program was comprehensively analyzed, focusing on the training required for FMT certification and career progression, including equipment training, the Maintenance Leadership Academy, and career development courses. When compared with national practices, notable strengths emerged such as a clear certification progression pathway, safety entry requirements, hybrid instructional methods, and a data-driven learning management approach. Nevertheless, the evaluation also identified opportunities for improvement, including the integration of microlearning resources and expanded partnerships for credentialing and certification.

Additionally, a job satisfaction survey administered to 146 current FMTs provided insights into their perceptions regarding job satisfaction, professional growth, salary and benefits, promotion opportunities, and management practices. While participants generally expressed satisfaction with workload, benefits, leave policies, and recognition from direct supervisors, they raised concerns about salary levels, slow promotions, and inadequate internal communications. FMTs specifically requested more frequent hands-on training, mentorship opportunities, and clearer career advancement pathways. Delays in certification processes and inconsistent access to professional development resources were also noted as significant issues. Importantly, employee satisfaction appeared to decrease with

longer tenure and higher rank, indicating the need for sustained and targeted engagement strategies.

To further assess the training program, two additional surveys examined perceptions from both trainees and trainers. Trainees evaluated factors such as training sufficiency, clarity of materials, hands-on practice opportunities, trainer competence, and post-training support, along with reasons for non-participation and recommendations for improvements. Trainers evaluated course content, delivery effectiveness, overall training quality, and shared best practices. Trainees appreciated the hands-on practice, trainer expertise, and interactive sessions, but voiced dissatisfaction with the limited frequency and variety of training sessions, outdated materials, inconsistent scheduling, and unclear advancement paths. Trainers were generally satisfied with the training content and field-based instruction but noted inconsistencies in training material quality, insufficient hands-on exercises, systemic scheduling issues, and expressed the need for additional instructional support. A positive correlation between training satisfaction and overall job satisfaction was confirmed, highlighting the importance of investing in quality training programs.

Based on these findings, several strategic improvements are recommended. Firstly, updating and modernizing training materials, such as manuals, exams, and digital resources, with scenario-based modules, microlearning videos, and simulation tools that reflect real-world challenges. Secondly, certification processes should be streamlined by reducing intervals between coursework completion and testing, and offering flexible examination windows tailored to individual readiness. Thirdly, enhance hands-on and field-based learning opportunities, localize session deliveries, and establish formal mentorship programs to expedite skill acquisition. Fourthly, enhance organizational communication through multi-channel messaging, transparent public dashboards for training and promotion metrics, and effective two-way feedback mechanisms. Fifthly, optimize scheduling by providing year-round courses aligned with seasonal workloads and managing enrollments via a centralized system. Sixthly, clearly define advancement paths by publishing transparent skill and certification roadmaps, integrating external credential recognition, and expediting employee reclassification upon achieving benchmarks. Finally, improve trainer support through standardized "Train the Trainer" initiatives, regular instructor evaluations, and recognition programs.

Implementing these recommendations will align MDOT SHA's training program more closely with operational needs, clearly define career paths, and foster a culture of continuous learning. Consequently, MDOT SHA can anticipate reduced turnover rates, an engaged and highly skilled workforce, and an enhanced transportation system that remains safe, reliable, and resilient for Maryland residents and businesses.

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# Chapter 1. Introduction

## 1.1 Background

The Facilities Maintenance Technician (FMT) workforce is an essential operational unit within the Maryland Department of Transportation State Highway Administration (MDOT SHA), responsible for maintaining, repairing, and supporting a wide array of transportation infrastructure assets. These assets include but are not limited to buildings, roadways, bridges, tunnels, rest areas, stormwater systems, and other critical facilities that ensure public safety, traveler mobility, and the uninterrupted functioning of the state's highway system. FMT personnel contribute directly to the preservation of Maryland's infrastructure and the successful delivery of MDOT SHA's mission.

FMT employees are expected to perform a wide variety of physically demanding tasks that include lifting heavy machinery, working at elevated heights, navigating confined spaces, handling hazardous materials, and operating specialized equipment. In addition to routine maintenance duties, they are frequently called upon to respond to urgent, weather-related, or emergency incidents—such as flooding, snow and ice conditions, and roadway infrastructure failures—where rapid mobilization is required. Given the nature of their responsibilities, FMTs are designated essential personnel, meaning they must be available 24 hours a day, 7 days a week, including weekends and holidays. Moreover, they must be capable of responding to emergency call-ins within one hour of notification to support the agency's incident response and continuity of operations.

In recognition of the critical function performed by the FMT workforce, MDOT SHA has implemented a structured training and certification program aimed at improving field competencies, enhancing workforce safety, and fostering professional growth. This program provides a combination of classroom-based instruction, practical hands-on training, and certification pathways that span multiple operational disciplines. FMTs receive training in the safe and effective use of heavy equipment such as dump trucks, tractor mowers, and forklifts, as well as foundational certifications including Commercial Driver's License (CDL) and ATSSA Flagger certification. The training program also includes a tiered certification framework, advancing from FMT I to FMT IV, with increasing responsibilities and technical proficiencies required at each level. In addition to initial training, FMTs are expected to complete refresher courses and meet continuing education requirements to remain compliant with agency and industry standards.

While these training efforts represent a substantial investment in workforce development, questions remain regarding their overall effectiveness, accessibility, and alignment with MDOT SHA's evolving operational needs. Furthermore, recent trends in employee turnover, combined with feedback from current FMT personnel, have raised concerns about training consistency, certification timelines, advancement clarity, and broader job satisfaction. At present, no comprehensive evaluation has been conducted to determine whether the training program is achieving its intended objectives in terms of performance outcomes, employee development, and retention.

To address this gap, this research project conducted a systematic assessment of MDOT SHA's FMT training program. The goals of the evaluation include: (1) benchmarking the current training program against national practices to identify areas for improvement; (2) analyzing feedback regarding job satisfaction; (3) evaluate the training program from both trainee and trainer's perspective; and (4) developing data-informed recommendations for enhancing training design, delivery, and strategic alignment. The findings from this effort will inform future revisions to the training program and support MDOT SHA's broader goal of cultivating a resilient, skilled, and well-supported maintenance workforce capable of meeting the state's infrastructure demands.

## 1.2 Objectives

The primary objectives of this research are to:

- ✚ **National Program Review:** Examine existing FMT training programs implemented by other state Departments of Transportation (DOTs) through a comprehensive literature review.
- ✚ **MDOT SHA Program Evaluation:** Assess the effectiveness of the current MDOT SHA training program in equipping FMT employees with the necessary skills and competencies.
- ✚ **Workforce Satisfaction Analysis:** Investigate job satisfaction levels among the current FMT workforce at MDOT SHA through surveys and analysis and identify possible factors influencing the high turnover rate among FMT employees.
- ✚ **Strategic Improvement Recommendations:** Develop actionable recommendations to enhance the existing training framework, ultimately improving employee skillsets, satisfaction, and retention.

By achieving these objectives, the research aims to support MDOT SHA in creating a training program that contributes significantly to operational efficiency, safety, and employee retention.

## 1.3 Report Organization

The remainder of this report is structured into five additional chapters, followed by references:

### Chapter 2: Nationwide Practices of Training Programs for Non-Supervisory-Level Maintenance Employees

Presents an overview of relevant practices adopted by state DOTs across the nation, including a summary of surveys, information requests, and literature review on training programs comparable to MDOT SHA's FMT.



### Chapter 3: Current FMT Training Program

Describes MDOT SHA's existing training program for FMTs, covering certification pathways, equipment training and certification procedures, and leadership development courses.



### Chapter 4: Survey Methodology and Administration

Presents the survey design and administration procedures used to assess FMT job satisfaction and evaluate the FMT training program.



### Chapter 5: Job Satisfaction of FMTs

Explores the factors influencing FMT job satisfaction, including survey findings on overall morale, and identified potential challenges related to retention.



### Chapter 6: Evaluation of Current FMT Training Program

Evaluates the effectiveness, accessibility, and impact of MDOT SHA's FMT training programs from both trainee and trainer perspectives, highlighting key strengths and areas for improvement.



### Chapter 7: Conclusion and Recommendations

Summarizes the major research findings and provides actionable recommendations to enhance MDOT SHA's training programs, thereby addressing workforce challenges and improving operational performance.

## **Chapter 2. Nationwide Practices of Training Programs**

### **2.1 Introduction**

As introduced in Chapter 1, MDOT SHA currently maintains a structured training program designed to equip FMTs with the knowledge, skills, and operational competencies required to execute their duties effectively and safely. This study aims to assess the effectiveness of MDOT SHA's existing FMT training program. The objective is to identify potential gaps, inefficiencies, or areas for improvement, and to provide evidence-based recommendations that support the delivery of consistent, up-to-date, and comprehensive training aligned with the operational demands of the FMT role.

To support this effort, a nationwide review of training practices for non-supervisory-level maintenance personnel was conducted. This benchmarking effort involved a multifaceted data collection approach, including direct information requests submitted to peer state departments of transportation, a structured survey disseminated through the Transportation Research Board (TRB) maintenance committees, and a targeted search of publicly available resources from state transportation agency websites. The purpose of this review is to contextualize MDOT SHA's program within the broader landscape of national practices, highlight exemplary models, and identify strategies that could inform future enhancements to the agency's FMT training framework. This chapter presents a summary of the findings from that national review.

### **2.2 Information Collection**

#### ***2.2.1 AASHTO Information Request***

To gain a comprehensive understanding of training programs for non-supervisory-level maintenance personnel across the United States, the research team conducted a formal information request through the American Association of State Highway and Transportation Officials (AASHTO) Committee on Maintenance. This effort was aimed at benchmarking current practices, evaluating program structures, and identifying potential enhancements applicable to the MDOT SHA FMT training framework.

Data were solicited via email correspondence distributed to maintenance offices within each state transportation agency. The request sought to capture detailed information regarding the design, delivery, and evaluation of existing training programs. Specifically, agencies were asked to respond to the following key questions:

- What is the duration of the training program?
- How often is the training program conducted?
- Who prepared the training materials?
- What is the trainer-to-trainee ratio?

In addition to these core questions, agencies were invited to provide supplementary documentation, including course curricula, training schedules, evaluation methodologies, and sample training materials. These artifacts were intended to offer deeper insights into program implementation and instructional content.

Comprehensive responses, comprising both written answers and supporting documents, were received from 15 state DOTs: North Dakota, Utah, Oregon, Colorado, Kentucky, Iowa, Maine, New Jersey, Arizona, Idaho, Ohio, Kansas, Arkansas, Oklahoma, and Texas. The collected data offer valuable perspectives on the range of training strategies employed nationally and serve as a foundational reference for identifying best practices and opportunities for improvement within MDOT SHA's FMT training program.

### ***2.2.2 TRB Survey***

To further improve the nationwide review of training practices for non-supervisory maintenance personnel, the research team conducted a structured online survey through the TRB Standing Committee on Maintenance and Operations Management. The objective of the survey was to capture detailed, firsthand insights into the scope, structure, and implementation of training programs used by state transportation agencies, particularly for maintenance personnel comparable to MDOT SHA's FMTs.

The survey was designed to accommodate two respondent groups: those representing agencies with established training programs and those from agencies currently lacking formalized programs. For respondents from states with existing training programs, the survey collected information on key program attributes, including:

- Primary training objectives and topics covered;
- Prerequisites for trainee enrollment;
- Training delivery formats (e.g., classroom, on-the-job, online);
- Program duration and frequency;
- Evaluation and assessment methodologies; and
- Certifying or credentialing components associated with program completion.

For agencies without existing programs, the survey focused on identifying the barriers

to implementation and capturing any planned initiatives or interest in developing future training infrastructure.

The second section of the survey offered respondents the opportunity to express interest in participating in follow-up interviews for more in-depth discussions. Contact information was requested from those willing to engage further, enabling the research team to pursue qualitative insights beyond the structured questionnaire.

Completed responses were received from transportation agency personnel in Idaho, New York, Wyoming, Louisiana, Colorado, Tennessee, Indiana, and New Jersey. These respondents represented a range of professional roles—including engineers, training specialists, and program directors—within their respective maintenance divisions. Of the participating states, only Tennessee indicated the absence of a formal training program, though the agency noted plans to develop one in the near future.

### ***2.2.3 Internet Search***

To supplement the information collected through direct agency outreach and survey instruments, the research team conducted an extensive web-based review to identify transportation facility maintenance training programs for non-supervisory-level maintenance personnel across all 50 U.S. states and the District of Columbia. This search aimed to enhance the comprehensiveness of the national scan by identifying publicly available training resources beyond those provided in response to the AASHTO information request and TRB survey.

The review focused on gathering detailed program-level information, including course descriptions, training schedules, target participant profiles, and points of contact for program administration. Particular emphasis was placed on identifying training programs directly applicable to DOT personnel, with the goal of understanding the structure, scope, and accessibility of these offerings.

As a result of this effort, relevant program information was successfully gathered from 13 states: Colorado, Iowa, Missouri, New Mexico, New York, North Carolina, South Carolina, South Dakota, Vermont, West Virginia, Wisconsin, and Wyoming. While the web search yielded some useful supplemental insights, a substantial portion of the results were associated with Local Technical Assistance Program (LTAP) or Transportation Curriculum Coordination Council (TC3) platforms. These offerings were typically geared toward local transportation agency staff and contractors rather than state DOT employees. Accordingly, LTAP and TC3-affiliated programs were excluded from further analysis to maintain alignment with the study's focus on training frameworks intended specifically for state DOT maintenance personnel.

It is worth noting, however, that certain states, such as South Carolina, South Dakota, West Virginia, Wisconsin, and Wyoming, were found to offer certification programs related to materials handling and other specialized areas. These programs serve both state agency employees and external stakeholders and may offer potential models for future DOT-targeted training development.

## **2.3 Summary of the Obtained Information**

Through a comprehensive information-gathering process, including the AASHTO Committee on Maintenance data request, the TRB survey, and an extensive internet search, the research team has synthesized key insights into the structure and delivery of non-supervisory maintenance training programs across the United States. This triangulated approach revealed both commonalities and divergences in how state departments of transportation approach workforce development for maintenance personnel.

### ***2.3.1 Findings from the AASHTO Data Request and Internet Search***

The training programs identified are primarily designed for non-supervisory-level maintenance employees, including new hires, recently promoted personnel, and those preparing for advancement. While some states implement broad, standardized training programs applicable to all maintenance staff, others offer tiered or specialized curricula tailored to specific career stages or technical roles.

Course duration and delivery frequency vary considerably across states. Some programs consist of short-term modules lasting only a few days, while others span multiple years with recurring sessions. Training materials are typically developed in-house, although several states integrate pre-recorded online content to support remote or asynchronous learning. Across the reviewed programs, a consistent set of core topics emerges. These include:

- Safety protocols and hazard mitigation
- Commercial Driver's License (CDL) preparation
- Equipment operation and preventive maintenance
- Snow and weather-related operations
- Career development, leadership, and mental health awareness

In addition, several states provide more specialized training in areas such as traffic control, infrastructure inspection, pavement maintenance, basic mathematics, and communication skills. These supplemental topics reflect state-specific operational priorities and workforce needs. [Table 1](#) and [Table 2](#) provide a concise summary of the information

gathered, and a more detailed examination of the collected information is presented in Section 2.4.

**Table 1:** Responses to the Questions in the AASHTO Information Request

State	Duration	Frequency	Material Preparation	Ratio
AR	6 classes	2 of the classes are every quarter. The other 4 are held twice a year in a 6-month period	The Department's instructional designer	6 main trainers with 10 subject matter experts
AZ	Roughly annually	Depends on when classes can be scheduled and filled and Computer Based Training (CBT) available all the time	By a variety of subject matter experts long ago, updated through DOT Technical Training staff as needed.	Roughly 10 to 20
CO	Two Years	Depends	Training Division	Depends
IA	Most finished in the first year of service	Annual training academy but no longer doing it	Half paid services and half internal	1 Training Specialist 2, 1 District GOA in each of 6 districts
ID	Depends*	Year round	Combination of ITD's Executive Leadership team, Horizontal Career Path Continuity Team, and Learning Development Team	Depends. Equipment training 10 people max and sweeper and rotary 5 max. Others average 20 people per class
KS	Depends*	Implemented from first hire date.	Field Maintenance Administrators within the Bureau of Maintenance	Depends based on hiring frequency, usually 1-5
KT	N/A	N/A	N/A	N/A
ME	Depends*	Training schedules are put together each quarter	By Fairfield Training Center and the Departments Maintenance and Operations Training Oversight Committee	Depends
ND	One Week	Two per Year	Location: National Guard Training Base; Staff: Internal. CDL: Hire out. Transport Institute	N/A

State	Duration	Frequency	Material Preparation	Ratio
NJ	Depends*	Level Set/Introduction: multiple times per year; HOT2 and HOT3 Advancement classes: once per year	Collaboration between inner training staff and a consultant	Depends
OH	Different among individuals	Each class at least once per year. Popular classes are up to 4 times per year.	An internal employee who has worked in the field for years for each course.	Most classes have 30 attendees to 1 instructor. More if it's virtual training
OK	Continuous throughout career	As needed, at least twice a year	Maintenance Division and HR	Depends on need, usually no more than 1 to 15
OR	Varies from five hours to two weeks	On Demand	Most: Internal. Compliance: Outside	CDL is one to one; others are up to 20 students
TX	Depends	Trainings are aggressive in the beginning through CDL training; equipment-specific trainings, MLA, and routine trainings are ongoing throughout career	Primarily developed by TxDOT Human Resources, Maintenance Division, and external partners in the Texas A&M Transportation Institute (TTI) and the University of Texas Center for Transportation Research (CTR).	Varies widely
UT	Two Years	Depends	Training Division	Depends
WV	One to five days (except CDL)	Year round	Equipment Operator Training Academy using various sources	From 1:1 to 1:10

**Table 2:** Requirements, Format, and Course Topics of the Training Programs

State	Requirements	Format	Course Topics
AZ	New employees or promotion for different level	In-person courses, Online Learning	Maintenance Communication, CDL License Requirement, Hazard Communication
CO	New hires, transportation maintenance, LTC OPS, Specialty	In-person courses	Safety, defensive driving, equipment maintenance, traffic control, storm management, computer skills, and leadership

State	Requirements	Format	Course Topics
ID	Transportation Technician, Operations from Entry Level to Step 3	In-person courses, Online Learning	Technology boot camp, defensive driving, basic traffic control, Storm 101, first aid, Hazardous Materials Module 1 Storm 102, AASHTO anti-icing/RWIS Curriculum (5.83.01-5.83.07), AASHTO equipment maintenance, AASHTO de-icing, environmental awareness, properties of materials, winter maintenance management, plans and specifications, and application of traffic control plans.
IA	Field employees	Online platforms, In-person courses, TED	Dump training, load securement, basic flagger operations, and fire safety awareness, entry-level driver training, defensive driving, traffic control, fall protection, and knuckle boom operation
KS	Employees during the first three years of their employment		Equipment Operator (EO) Trainee Program CDL/ELDT Program EO Senior Program Snow fighter Training
KY	Highway technician (HT) workers required to take training courses either before their re-classification or within 12 months of being hired or promoted	Online platforms, In-person courses	Flagger Training, Snow & Ice Training, First Aid Training, OSHA 10 certification, Anti-harassment/Anti-discrimination
ME	Transportation Workers I--III	In-person courses, Equipment training	Drug and alcohol use, general policies, basic computer skills, general field & equipment safety, work zone safety, OXY-Fuel cutting, excavation and trenching, erosion and sediment control, scaffolding, leadership training, basic mathematics and writing, and advanced technical training.
MO	New hires, Specific courses for specific job position, Optimal courses offered	Online platforms, In-person courses, TED	Back Safety & Injury Prevention, Basic Safety Training
NM	N/A	In-person courses, hands-on learning	Operation of dump trucks, loader rollers, and brooms, maintenance of unpaved roads, motor grade procedures, and maintenance & operation of backhoes

State	Requirements	Format	Course Topics
NJ	Highway Operations Technician	Formal training, on-the-job training, self-instruction	Roadway maintenance, sign repair, vegetation management, permanent patch, mower maintenance, sign installation, drainage plans, herbicide applications
NC	Transportation Workers, Transportation Supervisors, and Transportation Engineers	In-person courses, Workshops, Technical bulletins	Maintenance Management System (MMS) Training, Winter Weather Operations Snow & Ice Control for Operators
ND	New employees	In-person courses, Hands-on Training	MDSS Operations/T.I.M., Equipment Operations, Force America/Tow Plow & Wing Operations, Truck PM, and Loading Lashing
OR	New employees and individuals who do not meet the minimum qualifications for a maintenance specialist	In-person courses	Guardrail Repair, Pavement Patching, Chip Coating, Sealing, and Snowplow Driving
TX	Non-supervisory maintenance staff	In-person courses	CDL Licensing Training, Equipment-Specific Operator Trainings, Maintenance Leadership Academy (MLA) Training
UT	Transportation Technician I-III	Online courses, instructor-led training	CDL licensing, equipment operation, introduction to survey concepts, roadway materials, drainage, Google Apps, introduction to structures, plan reading, inspection & documentation, materials testing materials testing concepts, hazmat radiation safety training, basics of materials MOI
WV	Employees	Classroom and field operations	CDL, Basic Equipment Training, Power Operated Vegetation Equipment Training, Specialty Training, Certification Training, Mechanics Training, ASE Certifications, and Soft Training (Learning for Success)

### 2.3.2 Findings from the TRB survey

The information obtained through this survey provided critical supplementary context to the AASHTO request, allowing for a more comprehensive understanding of national training program practices, common challenges, and implementation strategies relevant to MDOT SHA's FMT workforce development goals.

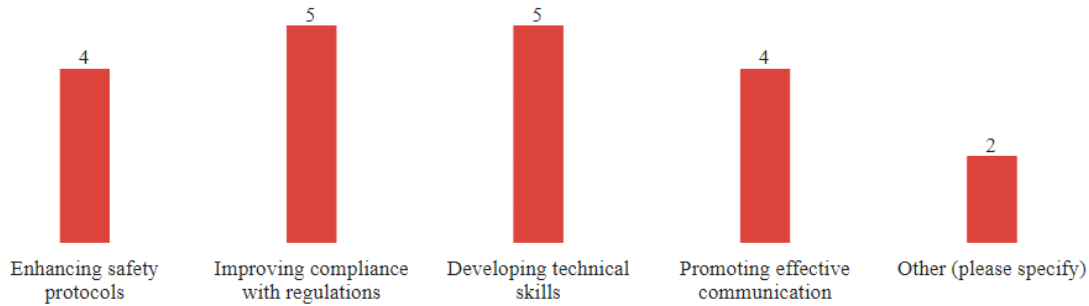
*Primary Objectives of State Training Programs*

As part of the nationwide review, participating states were asked to identify the primary objectives of their training programs for non-supervisory-level maintenance personnel. The responses, summarized in [Table 3](#), reveal a strong emphasis on safety, regulatory compliance, technical skill development, and communication. The variation in objectives also reflects differing agency priorities and operational contexts.

**Table 3:** Primary Training Objectives by States

<b>State</b>	<b>Primary Training Objectives</b>
<b>Colorado</b>	<ul style="list-style-type: none"> <li>- Enhance safety protocols</li> <li>- Improve regulatory compliance</li> <li>- Develop technical skills</li> <li>- Promote effective communication</li> </ul>
<b>Indiana</b>	<ul style="list-style-type: none"> <li>- Enhance safety protocols</li> <li>- Improve regulatory compliance</li> <li>- Develop technical skills</li> <li>- Promote effective communication</li> <li>- Establish consistent foundational knowledge</li> </ul>
<b>Louisiana</b>	<ul style="list-style-type: none"> <li>- Enhance safety protocols</li> <li>- Improve regulatory compliance</li> <li>- Develop technical skills</li> <li>- Promote effective communication</li> </ul>
<b>New Jersey</b>	<ul style="list-style-type: none"> <li>- Improve regulatory compliance</li> <li>- Develop technical skills</li> </ul>
<b>New York</b>	<ul style="list-style-type: none"> <li>- Enhance safety protocols</li> <li>- Develop technical skills</li> <li>- Promote effective communication</li> <li>- Provide equipment certifications</li> </ul>
<b>Wyoming</b>	<ul style="list-style-type: none"> <li>- Improve regulatory compliance</li> </ul>

These objectives are visually summarized in [Figure 1](#), which illustrates the frequency of each objective across the surveyed states.



**Figure 1:** Distribution of Primary Objectives of the Training Program(s)

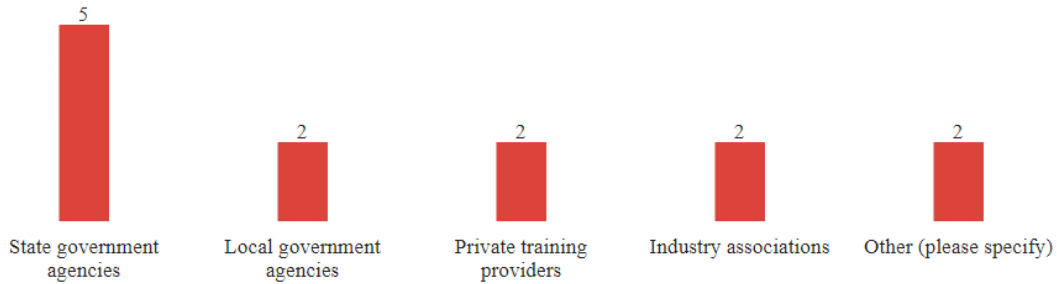
### *Entities Responsible for Training Program Delivery*

The delivery of maintenance training programs varies by state, with a range of entities involved in curriculum development, instruction, and administration. The responsible parties generally include state transportation agencies, local government partners, third-party providers, and industry associations. [Table 4](#) below summarizes the entities responsible for delivering training in each responding state.

**Table 4:** Entities Responsible for Training Delivery by States

State	Entities Responsible for Training Delivery
<b>Colorado</b>	- State government agencies - Local government agencies - Local Technical Assistance Programs (LTAP)
<b>Indiana</b>	- State government agencies - Private training providers - Industry associations
<b>Louisiana</b>	- State government agencies
<b>New Jersey</b>	- State government agencies - Local government agencies - Private training providers - Industry associations
<b>New York</b>	- NYSDOT equipment operator instructors
<b>Wyoming</b>	- State government agencies

These institutional roles are further illustrated in [Figure 2](#), which provides comparatively visualization of the distribution of training responsibilities among different types of entities.



**Figure 2:** Distribution of Entities Responsible for the Training Programs

*Training Topics Covered in State Programs*

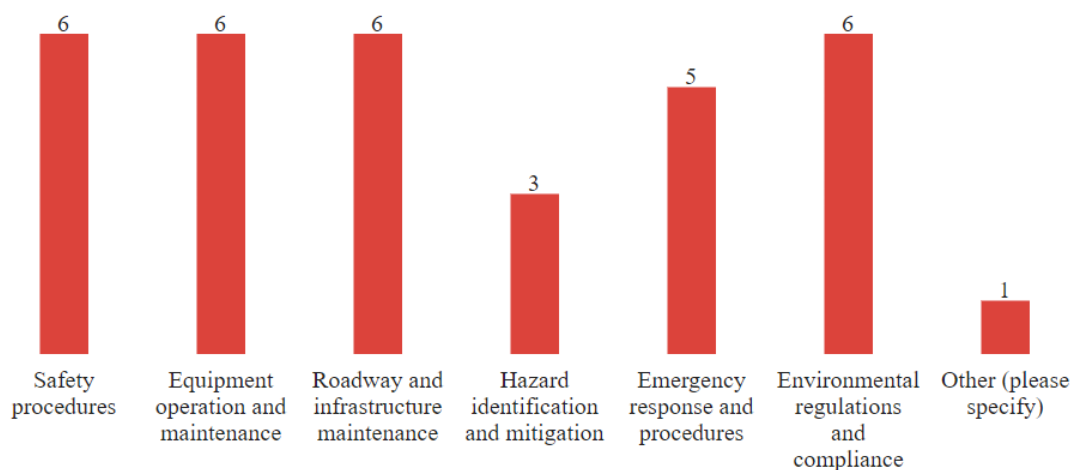
The content of maintenance training programs varies across states but generally covers a core set of technical and safety-related subjects. These include safety protocols, equipment operation, roadway and infrastructure maintenance, and environmental compliance. Additional topics, such as hazard mitigation and winter operations, are incorporated depending on regional needs and operational priorities. [Table 5](#) below provides a summary of the primary subjects addressed by each state's training program.

**Table 5:** Primary Topics Addressed by States

State	Primary Topics Addressed
<b>Colorado</b>	<ul style="list-style-type: none"> <li>- Safety procedures</li> <li>- Equipment operation and maintenance</li> <li>- Roadway and infrastructure maintenance</li> <li>- Emergency response and procedures</li> <li>- Environmental regulations and compliance</li> </ul>
<b>Indiana</b>	<ul style="list-style-type: none"> <li>- Safety procedures</li> <li>- Equipment operation and maintenance</li> <li>- Roadway and infrastructure maintenance</li> <li>- Hazard identification and mitigation</li> <li>- Emergency response and procedures</li> <li>- Environmental regulations and compliance</li> <li>- Winter operations</li> </ul>
<b>Louisiana</b>	<ul style="list-style-type: none"> <li>- Safety procedures</li> <li>- Equipment operation and maintenance</li> <li>- Roadway and infrastructure maintenance</li> <li>- Hazard identification and mitigation</li> <li>- Emergency response and procedures</li> <li>- Environmental regulations and compliance</li> </ul>
<b>New Jersey</b>	<ul style="list-style-type: none"> <li>- Safety procedures</li> </ul>

	<ul style="list-style-type: none"> <li>- Equipment operation and maintenance</li> <li>- Roadway and infrastructure maintenance</li> <li>- Hazard identification and mitigation</li> <li>- Emergency response and procedures</li> <li>- Environmental regulations and compliance</li> </ul>
<b>New York</b>	<ul style="list-style-type: none"> <li>- Safety procedures</li> <li>- Equipment operation and maintenance</li> <li>- Roadway and infrastructure maintenance</li> <li>- Emergency response and procedures</li> <li>- Environmental regulations and compliance</li> </ul>
<b>Wyoming</b>	<ul style="list-style-type: none"> <li>- Safety procedures</li> <li>- Equipment operation and maintenance</li> <li>- Roadway and infrastructure maintenance</li> <li>- Environmental regulations and compliance</li> </ul>

These training topics are further illustrated in [Figure 3](#), which highlights the frequency of each topic across surveyed states.



**Figure 3:** Distribution of Topics Addressed in the Training Programs

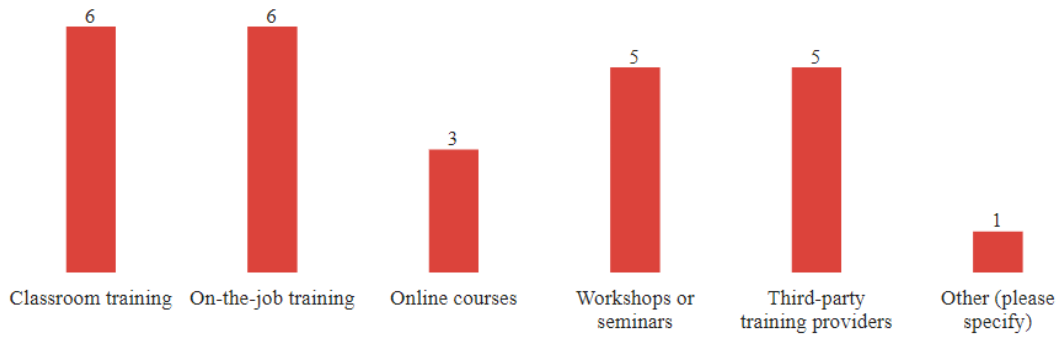
### *Training Delivery Methods*

State transportation agencies employ a range of instructional methods to deliver maintenance training programs, balancing classroom learning with field-based experience and digital content. Most agencies utilize a hybrid approach, integrating in-person instruction with on-the-job training and, in many cases, supplementary workshops or online courses. Several states also leverage third-party training providers to enhance instructional capacity and technical specialization. [Table 6](#) summarizes the delivery methods reported by each responding state.

**Table 6: Training Delivery Methods by States**

<b>State</b>	<b>Training Delivery Methods</b>
<b>Colorado</b>	<ul style="list-style-type: none"><li>- Classroom training</li><li>- On-the-job training</li><li>- Online courses</li><li>- Workshops or seminars</li><li>- Third-party training providers</li></ul>
<b>Indiana</b>	<ul style="list-style-type: none"><li>- Classroom training</li><li>- On-the-job training</li><li>- Online courses</li><li>- Workshops or seminars</li><li>- Third-party training providers</li></ul>
<b>Louisiana</b>	<ul style="list-style-type: none"><li>- Classroom training</li><li>- On-the-job training</li><li>- Workshops or seminars</li><li>- Third-party training providers</li></ul>
<b>New Jersey</b>	<ul style="list-style-type: none"><li>- Classroom training</li><li>- On-the-job training</li><li>- Online courses</li><li>- Workshops or seminars</li><li>- Third-party training providers</li></ul>
<b>New York</b>	<ul style="list-style-type: none"><li>- Classroom training</li><li>- On-the-job training</li><li>- Evaluation-based learning</li></ul>
<b>Wyoming</b>	<ul style="list-style-type: none"><li>- Classroom training</li><li>- On-the-job training</li><li>- Workshops or seminars</li><li>- Third-party training providers</li></ul>

These instructional formats are visually summarized in [Figure 4](#), which depicts the distribution of delivery methods among the surveyed states.



**Figure 4:** Distribution of the Methods of Training Program Delivery

### *Training Program Certifications and Evaluation Methods*

State maintenance training programs vary in terms of credentialing and evaluation practices. Some programs confer formal certifications, such as Commercial Driver’s Licenses (CDLs) or equipment-specific qualifications, while others issue certificates of completion or provide no formal recognition. The availability of certifications often depends on the specific training track or curriculum within a given program. [Table 7](#) summarizes the certification outcomes reported by each responding state:

**Table 7:** Certifications or Qualification Awarded by States

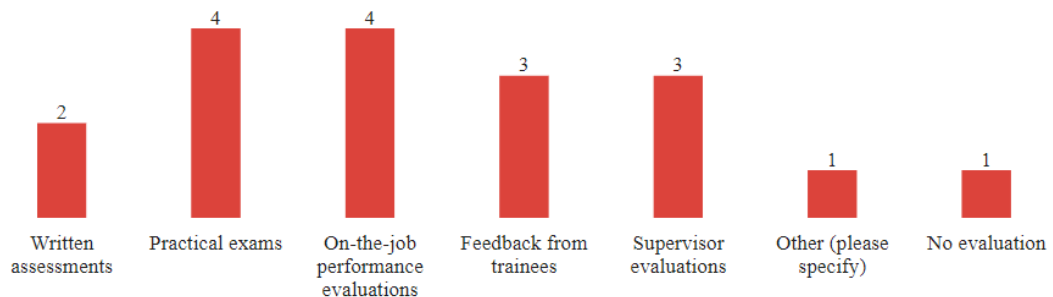
State	Certifications or Qualifications Awarded
<b>Colorado</b>	Yes – Commercial Driver’s License (CDL)
<b>Indiana</b>	Yes – Dependent on the specific training program
<b>Louisiana</b>	No
<b>New Jersey</b>	Yes – Dependent on the specific training program
<b>New York</b>	Yes – Equipment certification
<b>Wyoming</b>	Yes – Certificate of completion

In parallel, agencies employ a range of evaluation methods to assess the effectiveness of their training programs. These assessments may include written exams, hands-on testing, performance evaluations in operational settings, and feedback mechanisms involving both trainees and supervisors. [Table 8](#) outlines the evaluation methodologies used by each state:

**Table 8:** Training Program Evaluation Methods by States

State	Training Program Evaluation Methods
<b>Colorado</b>	- Written assessments - Practical exams - On-the-job performance evaluations - Supervisor evaluations
<b>Indiana</b>	- No formal evaluation methods reported
<b>Louisiana</b>	- Practical exams - On-the-job performance evaluations
<b>New Jersey</b>	- Written assessments - Practical exams - On-the-job performance evaluations - Trainee feedback - Supervisor evaluations
<b>New York</b>	- Practical exams - On-the-job performance evaluations - Trainee feedback - Surveys
<b>Wyoming</b>	- Trainee feedback - Supervisor evaluations

The distribution of certification practices and evaluation approaches is visually summarized in [Figure 5](#), which illustrates the diversity in state-level strategies for ensuring training quality and accountability.



**Figure 5:** Distribution of the Methods Employed to Evaluate the Effectives

## *Challenges and Areas for Improvement*

Several states identified specific challenges and areas for improvement in their current training programs. Indiana noted a continual need to refine and update training materials, emphasizing the importance of developing content that is more specific and relevant to field operations. The state also expressed concerns regarding the limited effectiveness of online training formats, stating that most field staff gain minimal value from virtual modules. However, delivering all training in-person remains a significant logistical hurdle due to resource and scheduling constraints. Similarly, New York highlighted the difficulty in maintaining statewide consistency across training content and delivery, particularly in ensuring uniform standards and instructional quality across diverse regions and facilities.

### **2.4 Nationwide Practices**

#### ***2.4.1 Arizona***

The training program in Arizona offers opportunities for individuals to enhance their skills and advance their careers in the field of highway operations. The duration of the program depends on the level at which participants enter. Those with a CDL and relevant experience start at higher levels (Worker, I, II, III), while others begin as Highway Operations Workers and gradually progress to become Highway Operations Tech (HOT) III, usually over the course of a year. Advancement to a Tech IV is competitive and typically involves leading a crew [1] \*.

The training program is conducted as scheduled classes. Some of the training modules are available as Computer Based Training (CBT) and can be accessed at any time. The training materials have been prepared by a variety of subject matter experts, with periodic updates by the Technical Training staff to ensure relevance and accuracy. The trainer-to-trainee ratio varies depending on the class and scheduling, typically ranging from 10 to 20 trainees per trainer.

#### ***2.4.2 Colorado***

The Maintenance Training Academy (MTA) of Colorado DOT oversees the maintenance training, serving approximately 1500 employees each year over a span of 45 weeks. This comprehensive program includes training for new hires and covers a diverse range of roles such as transportation maintenance, electrician, and mechanic. Key courses within the curriculum focus on safety, defensive driving, equipment maintenance, traffic control,

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\* These references are based on internal documents obtained through communication with the respective DOTs and are not publicly available.

storm management, computer skills, and leadership. The MTA Curriculum Committee, comprised of over 20 members selected by the maintenance superintendent of each section, is responsible for designing the curriculum. With an annual budget of approximately one million dollars, the MTA's funding supports staff compensation, operating expenses, facilities, and food service [2].

### 2.4.3 Idaho

The Idaho Department of Transportation's technician training program is embodied in the Transportation Technician Operations (TTO) Horizontal Career Path (HCP). This structured program guides employees through a series of progressive levels, with the expectation of achieving all criteria for Steps 1 through Step 3 within a span of five years from initiation. The TTO levels, along with their corresponding titles and pay rates [3] \*, are outlined in the following Table 9.

**Table 9:** TTO Levels and Associated Pay Rates

Levels	Title	Pay Rate
Entry Level	Transportation Technician, Apprentice (TTA)	\$18.15
Step 1	Transportation Technician (TT)	\$19.80
Step 2	Transportation Technician (TT)	\$21.45
Step 3	Transportation Technician, Operations (TTO)	\$23.14

The training required for each step is as follows:

- For Step 1, core courses consist of a communication development course, technology boot camp, defensive driving, basic traffic control, Storm 101, first aid, and Hazardous Materials Module 1.
- For Step 2, core courses include Storm 102, AASHTO anti-icing/RWIS Curriculum (5.83.01-5.83.07), AASHTO equipment maintenance, AASHTO de-icing, environmental awareness, and properties of materials.
- For Step 3, courses involve a leader development course, winter maintenance management, plans and specifications, and application of traffic control plans.

Upon successful completion of Step 3, employees are then mandated to take a minimum of 20 hours of supervisor-approved training annually for continuing education.

### 2.4.4 Iowa

Most maintenance employees at Iowa DOT complete their basic training within the

first year of service, with training being conducted continuously. A combination of purchased or contracted services and in-house creation is used to prepare the training materials. The training consists of both online courses and classroom instruction. For new field employees, initial training encompasses general topics like benefits, first aid, safety care, and emergency management. Within their first month of service, employees are expected to finish specific maintenance training modules, covering subjects such as dump training, load securement, basic flagger operations, and fire safety awareness, along with entry-level driver training if required. Within the first six months, defensive driving, traffic control, fall protection, and knuckle boom operation training are completed. The remainder of the job-specific courses must be concluded within the first year of employment. Training repetition is based on the specific needs associated with various job functions [4] \*.

#### **2.4.5 Kansas**

The Kansas Department of Transportation (KDOT) offers comprehensive training programs for its employees during the first three years of their employment. These training programs are designed to provide necessary skills and knowledge for improving job performance. The training materials are provided by Field Maintenance Administrators within the Bureau of Maintenance. The training components of those programs often involve self-study or self-driven testing, with a teacher-student ratio ranging from 1:1 to 1:5. The key training programs include:

- *Equipment Operator (EO) Trainee Program*

This mandatory one-year program focuses on safety awareness and proper handling of equipment. It is initiated from the first hire date, ensuring that new employees are well-versed in equipment operations and safety protocols. A reference document is provided to guide participants throughout the program.

- *CDL/ELDT Program*

New hires who do not possess a CDL are required to obtain one within 90 days of their hire date. In accordance with the Federal Motor Carrier Safety Administration (FMCSA) regulations, this program is aimed at helping new hires to obtain a Commercial Driver's License (CDL).

- *EO Senior Program*

Once an employee has obtained a CDL, they have the option to enroll in the voluntary EO Senior Program. This advanced program involves performing maintenance activities and is graded. Employees must complete a minimum of 2.5 years from obtaining

a CDL before they can pass the program. The program also introduces supervisory responsibilities, allowing participants to develop leadership skills at their own pace.

- *Snow Fighter Training*

This three-day program is specifically designed to train new employees on the fundamentals of Snow and Ice removal operations. Typically held in late fall, the training takes place in the six different regions of KDOT. It equips employees with the necessary knowledge and skills required to effectively handle snow and ice removal during winter seasons.

Overall, these training programs implemented by KDOT ensure that employees receive the necessary training and skills to perform their job responsibilities effectively, while also emphasizing safety awareness, advanced work, and specialized operations such as snow and ice removal.

#### **2.4.6 Kentucky**

The Kentucky highway technician (HT) workers are mandated to complete specific training courses either before their reclassification or within 12 months of being hired or promoted. The training consists of eight stages, divided as follows: two stages for HT assistants, four stages for HTs, and two stages for HT superintendents [5] \*.

- *Highway Technician Assistant (HTA) Training*

Includes HT Academy Prerequisites and Level 1, covering Flagger Training (renewed every 2 years), Snow & Ice Removal, First Aid (renewed every 2 years), OSHA 10, Anti-harassment/Anti-discrimination, Title VI, Discrimination Procedures, Executive Branch Ethics, Chainsaw Safety, Safety Leadership, and Class B CDL. Providers include District, Safety & Health Branch, Professional Development Branch, online platforms, and KTC/Bryan Equip.

- *Highway Technician (HT) Training*

HT Academy Levels 2-5 feature courses in leadership, communications, Snow & Ice Removal, Environmental Awareness, Roadside Vegetation Management, Bridge Repair & Maintenance, Basic Plan Reading, TC3 Structural Inspection, and Class A CDL. Courses are provided by Professional Development Branch, TC3, and KTC.

- *Highway Technician Superintendent (HTS) Training*

Leadership Levels 1 and 2 primarily cover management and leadership, including Superintendent Basics, Estimating, Leadership, Highway Slope Maintenance, Rural

Road Safety, Incident Management, and Work Zone Traffic Control. Providers include District, Maintenance, Professional Development Branch, and KTC.

#### 2.4.7 *Maine*

The Maine Department of Transportation offers tailored training for non-supervisory maintenance employees, structured around three career tiers: Transportation Worker (TW) I, II, and III. Each tier reflects increased proficiency in tasks such as snow and ice operations, bridge and highway maintenance, drainage, striping, signage, and signals [6] \*.

- *TW I*

Entry-level employees (1–3 years of experience), proficient in basic tasks. Within the first six months, they must complete R-6 courses, and within the first year, R-12 courses. Afterward, TW Is receive 24 hours of annual classroom training and up to two equipment training sessions annually.

- *TW II*

Typically have 5–15 years of experience, forming the backbone of crews. Promotion requires completing all R-6, R-12, and Entry Requirement (ER) courses, including subjects like OXY-Fuel cutting, excavation and trenching, erosion control, and scaffolding.

- *TW III*

Highly experienced workers specializing in specific skills. Promotion requires completion of all ER courses for TW II and III, including leadership training, basic math and writing, and advanced technical skills. Two elective courses relevant to job responsibilities must also be completed.

- *Training & Advancement*

R-6 and R-12 courses cover HR policies (drug/alcohol, computer skills) and safety operations (general safety, work zone safety). Courses are delivered by Fairfield Training Center staff and members of the Maintenance and Operations Training Oversight Committee.

Promotion requires passing mandatory Hurdle Tests administered quarterly. Progression from TW I to TW II involves a 50-question multiple-choice exam (80% passing score). Advancement from TW II to TW III requires both a written exam and a practical exam (80% passing score for each).

Employees are encouraged to share expertise through training and mentorship, with additional preparation time provided for instructional duties.

#### **2.4.8 Missouri**

The Missouri Department of Transportation (MoDOT) provides comprehensive training for technicians, covering a wide range of topics [7]:

- *Emergency Management*  
Offered through NIMS, ICS, and TIMS. Courses focus on incident command, resource management, and effective traffic incident clearance to ensure responder and motorist safety.
- *Occupational Safety & Health Administration (OSHA)*  
Includes OSHA 10 Construction, OSHA 10 General Industry, and workplace health courses on hygiene, contagious disease prevention, and CDC cleaning recommendations. Additional offerings address ergonomics and work-zone safety.
- *MoDOT U*  
Delivers a broad catalog of TC3 courses, including CDL, Equipment Maintenance, Fall Protection, Maintenance Training, PCC Pavement Preservation, and Winter Maintenance Management.
- *Safety*  
Courses such as Back Safety & Injury Prevention, Electrical Safety, Forklift Safety, and Hand/Power Tool Safety.
- *Mental Health & EEO*  
Focuses on pandemic-related mental health challenges, equal employment best practices, TED Talks, and ComPsych webinars addressing drug/alcohol effects, communication, and efficiency.

In sum, MoDOT's diverse training ensures a competent, resilient workforce and promotes higher safety and quality standards in transportation projects. These certifications contribute to reliable infrastructure, benefiting both technicians and the public.

#### **2.4.9 New Mexico**

The New Mexico Department of Transportation Training Academy [8] is an institution committed to developing the skills and knowledge of its employees, with a focus on safety,

preventive maintenance, and heavy equipment operation. This endeavor is pivotal to align the employees' abilities with the Department's goals and objectives.

The Training Academy is a comprehensive educational facility, boasting an instructional center furnished with a conference room, a fully equipped workshop, and expansive training grounds that span over 135 acres. The Academy is home to more than 100 pieces of equipment, forming a substantial part of the hands-on learning resources for trainees. A team of experienced instructors, devoted to fulfilling the training needs of the Department, facilitates the educational process at the Academy.

Courses at the Training Academy are scheduled quarterly, aligning with the Department's training requirements. The Academy extends a diverse array of courses which include the operation of dump trucks, loader rollers, and brooms, maintenance of unpaved roads, motor grade procedures, and maintenance and operation of backhoes. It also provides CDL training among other offerings. Applications for these courses are channeled through training contact representatives from each District and the General Office, ensuring a smooth and efficient registration process for potential trainees.

#### ***2.4.10 New Jersey***

The New Jersey Department of Transportation (NJDOT) offers an advancement program for Highway Operations Technicians (HOT), integrating formal training, on-the-job experience, and self-instruction [9] \*.

##### *Formal Training*

- **Level Set Training** (for new HOT Trainees) covers NJDOT safety policy, roadway maintenance, sign repair, vegetation management, construction, and winter operations. Attendees learn to operate key equipment (e.g., tar pots, asphalt heaters, chainsaws, mowers, snowplows).
- **Advanced Training** builds on Level Set Training:
  - **HOT 1 & 2:** Covers permanent patch, construction, mower maintenance, sign installation, and equipment operation (e.g., skid steers, wheel loaders, slope mowers).
  - **HOT 3:** Focuses on advanced construction details, sign/drainage plans, herbicide application records, and equipment operation (e.g., aerial trucks, herbicide trucks, tandem plows).

### *On-the-Job Training*

Employees gain higher-level knowledge and skills by performing tasks required of advanced positions.

### *Self-Instruction*

NJDOT's intranet and resources (e.g., NJDOT Equipment Skills Guide, equipment manuals) provide crucial information for advanced roles.

### *Training Facility*

NJDOT's dedicated training center includes specialized classrooms and labs equipped with real roadway structures, traffic control devices, and vehicle maintenance stations for hands-on learning in safe conditions [10] \*. The facility features:

- Lecture halls, classrooms, computer labs, conference rooms, and locker facilities.
- Two full-motion CDL truck simulators.
- Specialized labs (Construction, Landscape & Roadway; Electrical & Sign; Automotive; Equipment Training Bay).
- A simulated roadway area with functioning signals, lights, camera systems, overhead signs, and drainage structures for practical maintenance training, plus an adjacent space for CDL training and testing.

#### **2.4.11 North Carolina**

State Maintenance Operations Training in North Carolina [11] offers comprehensive technical and leadership training for maintenance employees at three distinct levels: Transportation Workers, Transportation Supervisors, and Transportation Engineers. Transportation Workers receive training primarily through equipment-oriented self-study manuals, supplemented by on-the-job training. Additionally, they have access to task-driven self-study materials that provide in-depth knowledge on daily maintenance operations.

For Transportation Supervisors, who are responsible for making operational and management decisions, a combination of technical and leadership training is provided. This includes specific "How and Why" courses, workshops, and manuals tailored to their needs. The Transportation Supervisors Academy also focuses on developing their skills in leading technical crews. Transportation Engineers, on the other hand, have their technical and leadership training needs met through annual workshops, manuals, and technical bulletins. The Transportation Engineers Academy aims to cultivate leadership abilities specifically

related to technical operations.

State Maintenance Operations Training in North Carolina ensures that maintenance employees at different levels receive specialized training that addresses their specific needs and equips them with the necessary skills to excel in their respective roles.

#### ***2.4.12 North Dakota***

North Dakota offers two Maintenance Academies at the National Guard training base to train new employees. These academies provide specialized training for different seasons, with one week dedicated to summer equipment and another for winter operations. The courses are taught by experienced internal staff [12] \*.

During the spring session, participants can learn various skills, including Equipment Operations, Bridge Preservation/Structural Concrete, Pavement Preservation Tools, and Traffic Control/Safety. In the winter training program, the focus shifts to MDSS Operations/T.I.M., Equipment Operations, Force America/Tow Plow & Wing Operations, Truck PM, and Loading Lashing. Both programs emphasize hands-on training to ensure practical experience.

To meet CDL training needs, the North Dakota Department of DOT outsources the training to qualified providers. Additionally, North Dakota DOT collaborates with the Transportation Institute to offer specialized training programs that benefit the organization and the local community. For example, North Dakota DOT conducts Tractor Mower Operator Safety Training to enhance safety practices.

In summary, North Dakota DOT is committed to providing comprehensive training opportunities for employees, ensuring they have the necessary skills and knowledge to perform their duties effectively and safely.

#### ***2.4.13 Oklahoma***

The transportation training program in Oklahoma offers continuous training throughout an individual's career in the field. The program is conducted as needed, with sessions taking place at least twice a year at different locations based on the areas with the greatest demand. The training materials are primarily prepared by the Maintenance Division, with assistance from the Human Resources department. The trainer-to-trainee ratio varies depending on the specific requirements but typically does not exceed 1 trainer for every 15 trainees.

#### **2.4.14 Oregon**

The Oregon Department of Transportation (ODOT) offers flexible, on-demand Maintenance and Operations training courses, varying in length from a few hours to 5–10 days. Courses cover essential topics like truck and trailer safety, equipment loading, tie-down procedures, Work Zone Traffic Control, and First Responder training [13] \*. The Maintenance Employee Orientation (MEO) is available upon request to prepare new hires for fieldwork with their crews.

Training is delivered by internal staff, with select compliance/certification courses provided by external vendors. Class sizes vary—CDL training is one-on-one, while classroom sessions may accommodate up to 20 trainees per instructor.

- *Maintenance Trainee Program (MTP)*

ODOT’s Maintenance Trainee Program (MTP) is a 24-month hands-on initiative for individuals who do not initially meet the qualifications for a transportation maintenance specialist. Trainees gain essential safety skills and complete the training needed to earn a Class A CDL. Throughout the program, participants rotate through various highway maintenance activities, including:

- Striping, repainting, and pavement patching
- Guardrail and signage installation/repair
- Bridge and drawbridge maintenance
- Landscaping, chip sealing, snowplowing, and more

This immersive experience equips trainees with practical skills across multiple maintenance disciplines, setting them up for long-term careers in transportation.

#### **2.4.15 Texas**

The Texas Department of Transportation (TxDOT) offers an extensive training program aimed at non-supervisory maintenance staff. The program covers a range of essential topics and consists of the following components:

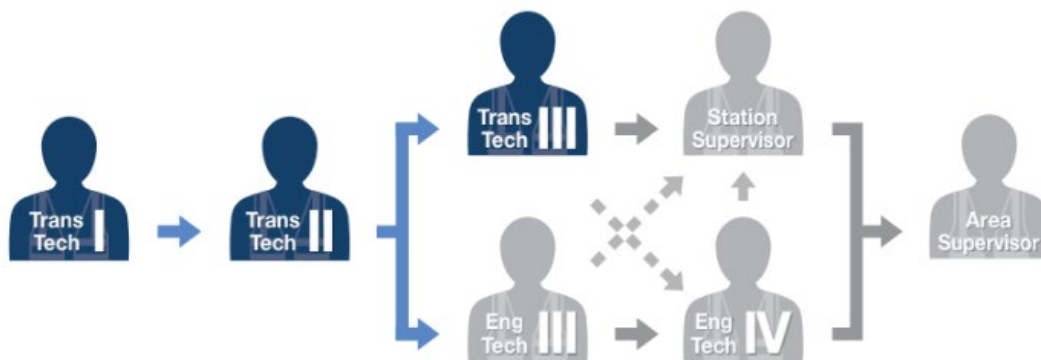
- *New-Employee Orientation (NEO) and New-Employee Safety Orientation (NESO):* These introductory sessions acquaint new hires with TxDOT's policies, procedures, and safety protocols.
- *Smith-System Driver Training:* Participants receive comprehensive instruction on safe driving techniques, emphasizing defensive driving skills.

- *CDL Licensing Training:* TxDOT provides rigorous training to obtain a Commercial Driver's License (CDL) to ensure staff members possess the necessary qualifications to operate vehicles effectively and safely.
- *Equipment-Specific Operator Trainings:* Training sessions are conducted for operating various types of heavy equipment commonly used in maintenance activities. These sessions focus on enhancing proficiency and safety.
- *Maintenance Leadership Academy (MLA) Training:* Designed for individuals aspiring to assume leadership roles within the maintenance department, this program equips participants with the necessary skills and knowledge.
- *Routine Training:* TxDOT emphasizes ongoing training throughout employees' careers. These routine sessions cover topics such as ethics, compliance, information security, and employee conduct.

Class sizes for the training sessions can vary significantly, accommodating a wide range of participants and ensuring effective learning experiences. The development of training materials primarily involves collaboration between TxDOT Human Resources, Maintenance Division, and external partners, including the Texas A&M Transportation Institute (TTI) and the University of Texas Center for Transportation Research (CTR).

#### 2.4.16 Utah

The Utah Department of Transportation (UDOT) offers a specialized career development program known as TransTech, designed to assist transportation technicians in improving their knowledge, skills, and abilities. This comprehensive program paves the way for technicians to advance their careers within UDOT, from the entry-level TransTech I position to the more advanced TransTech III role [14], as shown in Figure 6.



**Figure 6:** Career Path of TransTech at UDOT

TransTech employs a blend of online courses and instructor-led training, allowing employees to complete the program at their own pace. This tailored approach also links the completion of each training phase to a pay increase, incentivizing continuous professional development.

The TransTech I level consists of three phases, each associated with a 6% pay increase upon completion. Phase I, to be finished within the first six months, covers new employee orientation, CDL licensing, equipment operation, introduction to survey concepts, roadway materials, drainage, Google Apps, and on-the-job training. Phase II, beginning after six months, includes an introduction to structures, plan reading, inspection & documentation, materials testing, two TC3 courses, math/English, and further on-the-job training. Phase III, starting after 12 months and completion of Phase II, encompasses daily progress report inspection, materials testing concepts, hazmat radiation safety training, basics of materials MOI, beginning Microsoft Word/Excel, and additional on-the-job training. Upon the completion and peer approval of Phase III, a TransTech I technician can progress to TransTech II, accompanied by another 6% pay increase.

TransTech II training starts after 18 months and involves a series of courses covering CEMT workshop/coursework, ADA Ped Ramp, crash cushion, inspection & documentation, math/English, intermediate Microsoft Word/Excel, beginning MS PowerPoint, Google Apps 2, and more on-the-job training. This completion results in a 4% pay increment. Once TransTech II training is completed, technicians qualified for TransTech III can specialize in maintenance, specialty crew, materials lab, inspector, or project administration. For instance, the maintenance training includes leadership & mentoring, advanced computer skills, budget planning, maintenance planning system, landscape/weed control, estimating maintenance jobs/finalizing work contracts, all aspects of shed supervision, advanced scheduling HMA placement, advanced traffic control supervisor, and crash cushion. Completion of a specialty track merits a 6% pay increment. Moreover, selection for a TransTech III position comes with an additional 8% pay increment.

## **2.5 Summary**

To understand the current nationwide practices of training programs for non-supervisory-level maintenance employees, who serve as counterparts to FMT workforces, a comprehensive review was conducted by the research team. Three information-gathering methods were employed, including direct information requests to state transportation agencies through the AASHTO Committee on Maintenance, an online survey distributed through the TRB Standing Committee on Maintenance and Operations Management, as well as an Internet search of state transportation agency websites. In total, fifteen states responded to the AASHTO information request, and among them, ten states provided more detailed

training materials. Additionally, seven states participated in the online survey distributed through the TRB, and information from three more states was gathered from the Internet.

According to the gathered information, the training programs primarily focus on addressing the needs of non-supervisory-level maintenance employees, including those who are newly hired, seeking promotion, or have recently been promoted within the organization. Each state offers a unique mix of training programs, with some providing general courses, while others tailor specialized programs based on workers' career levels. Consequently, the duration of these courses varies significantly, ranging from a few days to several years, and the frequency of training sessions also differs from state to state. The training materials are predominantly developed internally, although some states incorporate pre-recorded online courses to enhance their training resources.

The training courses provided by different states encompass a diverse range of topics. Core themes found across the programs include Safety, CDL (Commercial Driver's License), Equipment Operation and Maintenance, Snow and Weather Operation, as well as Career Development and Mental Health aspects. Furthermore, certain states go the extra mile by offering specialized courses, such as Traffic Control, Inspection, Pavement Maintenance, Basic Mathematics, and Communication, catering to the specific needs of maintenance employees.

## Chapter 3. Current FMT Training Program

### 3.1 FMT Certification Requirements

MDOT SHA outlines specific training and certification pathways for FMTs, structured progressively from entry-level (FMT I) to supervisory positions (Facility Maintenance Supervisor). The detailed requirements for each FMT level are as follows:

#### 3.1.1 *FMT I*

Employees at the FMT I level must meet foundational certification standards during their probationary period, including:

- Obtaining a Commercial Driver's License Class B (CDL-B), which entails:
  - FMCSA (Federal Motor Carrier Safety Administration) Theory Training.
  - FMCSA Behind-the-Wheel (BTW) Training.
- Achieving certification from the American Traffic Safety Services Association (ATSSA) Flagger program through in-person training using Maryland-specific materials provided by ATSSA.

#### 3.1.2 *FMT II*

FMT II builds on the foundational skills developed at the FMT I level and adds additional operational competencies, including:

- All certification requirements outlined for FMT I.
- Equipment operation certifications for:
  - Dump Truck
  - Tractor Mower
  - Forklift
  - Front End Loader
- Level II Forms Certification involving proficiency with:
  - Operator's Daily Checklist Form.
  - Equipment Service Request Form.
- In-person instruction covering the Basic Temporary Traffic Control overview.

### **3.1.3 FMT III**

FMT III incorporates all FMT II requirements and introduces higher-level equipment certifications and additional documentation responsibilities:

- All previously outlined FMT II certification requirements.
- Tractor Trailer Certification and attainment of a CDL-A license.
- Excavator Certification or Mini Excavator Certification.
- Level III Forms Certification covering:
  - Team Activity Card.
  - Equipment Usage Report.
  - Inspector's Daily Report.
- Maryland Department of the Environment (MDE) Erosion and Sediment Responsible Personnel Certification (RPC Card), obtained online and requiring renewal every four years.
- Additional environmental management certifications, including:
  - Three selective certifications chosen based on operational requirements.
  - At least one additional certification from the following:
    - Construction Math
    - Plan Reading
    - Grade Stakes Certification
    - Pesticide Applicator Registration

### **3.1.4 FMT IV & Facility Maintenance Supervisor**

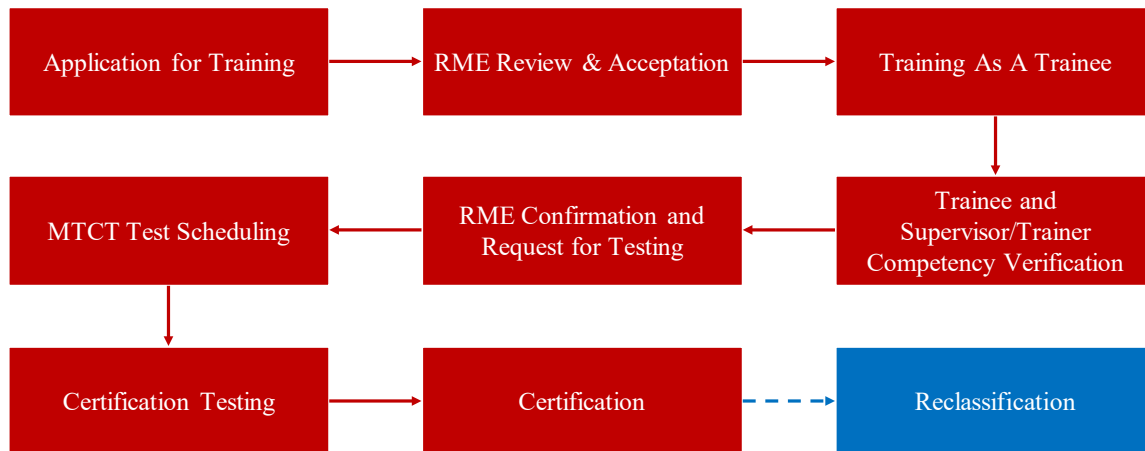
At the supervisory level, certification requirements are more extensive and include advanced operational, managerial, and procurement responsibilities:

- All previously defined FMT II requirements.
- Maintain a valid Commercial Driver's License Class A or B (CDL-A or CDL-B).
- ATSSA Temporary Traffic Control Traffic Manager Certification.
- Level III Forms Certification (as specified in FMT III).
- Environmental and managerial certifications exclusive to SHA, including:
  - MDE RPC Card.

- MTBMA (Maryland Transportation Builders and Materials Association) Temporary Traffic Control Traffic Manager Certification (SHA-specific).
- MTBMA Erosion & Sediment Certification (SHA-specific).
- SHA Basic Small Procurement Certification.
- Three additional selective certifications to further support operational excellence and supervisory capabilities.

### 3.2 Equipment Training and Certification Process

MDOT SHA has established a structured process to ensure that maintenance employees receive standardized training and certification for operating specialized equipment. This process, illustrated in Figure 7, outlines the sequence of steps from initial application to final reclassification, ensuring both competency development and operational readiness.



**Figure 7:** Equipment training and certification process

The process begins with an Application for Training, followed by Review and Acceptance by the Regional Maintenance Engineer (RME). Upon approval, the candidate enters the Training as a Trainee phase, during which foundational skills are developed under supervision. Once training is complete, both the Trainee and Supervisor/Trainer must verify competency, which is then followed by RME Confirmation and Request for Testing.

After this verification, the process proceeds to MTCT Test Scheduling, leading to Certification Testing, which is a two-part examination consisting of:

- **Field Test:** 100% score required for passing.
- **Written Test:** Minimum 80% score required.

Candidates are allowed up to three attempts (one original and two retests) to pass the certification. Prior to a retest, individuals must complete either five hours of field operation or ten working days of written study. If a candidate fails all three attempts, a six-month waiting period is imposed, after which they must restart the certification process from the beginning. Additionally, all certification requirements must be met within one year from the original test date.

Successful completion of the certification leads to formal Certification, which may then trigger the Reclassification process. This step is initiated when an employee fulfills both the certification requirements and the job specification criteria for advancement (e.g., from FMT I to FMT II or FMT III). The reclassification process involves:

- Developing a reclassification package,
- Submitting it through the District Administrative Team,
- Undergoing review by the Office of Maintenance Assistant Division Chief, and
- Forwarding the final package to the Classification Division for approval.

### **3.3 Maintenance Leadership Academy**

The Maintenance Leadership Academy is a structured training program initiated by the Office of Maintenance (OOM) to support the professional development of MDOT SHA personnel. Specifically designed for newly appointed Regional Maintenance Engineers (RMEs), Assistant Regional Maintenance Engineers (ARMEs), and Facility Maintenance Supervisors (FMSs), the academy provides participants with the foundational skills and knowledge needed for effective maintenance leadership and operational oversight.

#### *Program Objective*

The primary goal of the academy is to enhance participants' understanding of SHA's financial and operational systems, thereby strengthening their capacity to manage maintenance operations effectively and efficiently.

#### *Curriculum Highlights*

[Table 10](#) presents the course topics covered in the Maintenance Leadership Academy, outlining the core areas of focus throughout the program:

1. Financial and Operational Stewardship:

Participants will develop a clear understanding of their responsibilities as maintenance managers, particularly in terms of fiscal oversight and operational accountability within

SHA.

2. System Proficiency:

The program provides hands-on training in SHA-specific systems such as FMIS Ledgers, R\*STARS, and ADPICS, as well as the related documentation processes that support these systems.

3. Decision-Making and Analytical Skills:

Trainees will learn to recognize and apply key decision-making criteria essential for analyzing and addressing SHA's operational needs.

4. Data-Driven Management:

Emphasis is placed on using data from SHA's financial and operational systems to inform strategic planning, monitor performance, and drive continuous improvement in maintenance operations.

**Table 10:** Courses Provided by MLA Training

Topics
Procurement and Contract Management
Winter A-Z
Office of Administration (Introduction)
Employee/Employer Relations (EER) Topics
Office of Finance (Introduction)
Office of Equal Opportunity (Introduction)
Business Correspondence and Composing Emails
Medical Issues
Office of Traffic and Safety (Introduction)
DFO Discussion
Facilities Maintenance Division (Introduction)
Environmental Compliance Division (Introduction)

### 3.4 Training Offered By Organizational Development Division

The MDOT SHA Office of Administration Organizational Development Division (OD) offers a comprehensive suite of programs designed to support workforce development across all career stages and staff levels (Table 11). The offerings range from high-level strategic leadership courses, such as *Northbound 10*, the *Advanced Leadership Program (ALP)*, and *LEAD* for mid-level managers, to mandatory onboarding and supervisor development programs like *STEP*, *MYLO*, and *Employee Onboarding*. The division also provides specialized tracks for engineers (*Engineer Experience*, *PE Prep*), FMTs (*Facility Maintenance Experience*), and HR professionals (*SHRM Prep*), alongside inclusive efforts such as *DIVE IN* diversity training and the *Mentoring & Development Program (MDP)*. Supported by the Cornerstone OnDemand (CSOD) learning platform [15], the OD division promotes continuous growth through microlearning, tuition reimbursement, and career-enabling certifications—reinforcing a culture of lifelong learning, inclusion, and performance advancement.

**Table 11:** Organizational Development Division Training Programs

Program Name	Description
Northbound 10	SHA's Five Year Strategic Plan led by a cross section of employees from across the agency.
Diversity, Equity & Inclusion Program (DIVE IN)	SHA's premiere diversity training program for all Managers/Supervisors.
Advanced Leadership Program (ALP)	Two-year initiative where selected leaders develop and refine executive leadership skills.
Managing Yourself & Leading Others (MYLO)	Mandatory refresher training for Managers who haven't had training in 5+ years.
Leadership, Education and Development Program (LEAD)	Mid-level Manager training with Capstone Projects presented to SMT.
Supervisory Training & Enhancement Program (STEP)	Mandatory training for all new supervisors (3 months-1 year).
Professional Enrichment Program (PEP)	Ten-part series offering tailored leadership sessions for non-supervisors.
Engineer Experience (formerly GETP)	Mandatory intro to SHA goals/processes for engineers (skill-building, rotations, career dev).
Facility Maintenance Experience	Intro to SHA for FMTs focusing on teamwork, self-development, and career initiation.
Employee Onboarding Program	Welcoming program improving morale, engagement, and satisfaction.

New Employee Orientation (NEO)	Monthly welcome initiative introducing new hires to SMT and SHA divisions.
Mentoring & Development Program (MDP)	Newly developed mentoring program for all employees.
Society for Human Resources Management (SHRM)	12-week prep program for SHRM certification.
Professional Engineer (PE) Prep	Training program for PE license certification.
Cornerstone OnDemand (CSOD)	SHA's learning platform for training transcripts and online courses.
Employee Development Day	Informational training sessions and SHA/OD showcase.
Advanced Education Program (AEP)	Tuition reimbursement for permanent employees post-probation.

### 3.5 Comparison with nationwide practices

#### 3.5.1 Program Strengths

- Office of Maintenance

##### (a) *Step-by-step certification ladder*

The FMT training program is built around a structured certification ladder, progressing through four levels: FMT I, II, III, and IV. This tiered system mirrors the apprentice–journeyman–senior technician model widely used across top-performing state DOTs. It enables transparent, skill-based promotions, where employees advance by demonstrating proficiency rather than merely through tenure. The framework also includes corresponding pay incentives at each level, which helps to improve job satisfaction, particularly among newer hires seeking a clear growth trajectory.

##### (b) *“Safety first” entry gate*

All FMTs are required to obtain a CDL-A or CDL-B during their probationary period, ensuring they are licensed to operate heavy equipment critical to maintenance operations. In addition, mandatory training includes core competencies such as traffic control (flagging), safe operation of heavy machinery, and driver improvement programs. These safety-first protocols meet or exceed national baseline standards for non-supervisory maintenance personnel.

##### (c) *Hybrid learning model*

The OOM uses a hybrid training model that integrates multiple methods to meet the

diverse needs of its workforce. Trainees receive in-person instruction to build foundational knowledge, followed by hands-on field training to reinforce practical skills in simulated real-world conditions. In addition, computer-based modules are available to support self-paced review and refresher training, allowing flexibility for staff working on rotating or overnight shifts. This hybrid approach ensures that training remains both scalable and effective, an essential feature for maintaining readiness across a 24/7 maintenance operation.

*(d) Region-validated content*

MDOT SHA's Salt Management Plan and brine operations have been highlighted by MWCOG (Metropolitan Washington Council of Governments) as a regional model for environmentally responsible and efficient winter operations.

- Organizational Development Division

*(a) National Recognition*

MDOT SHA is one of the few public-sector agencies to be named to *Training Magazine's* "Top 100" multiple times [16], an honor typically reserved for large corporations and major states. This underscores the quality, scale, and effectiveness of its programs.

*(b) Full Leadership Pipeline*

The OD offers a comprehensive leadership development pipeline that supports employee growth from entry-level through management. New hires begin with Technician Onboarding, followed by STEP for new supervisors, LEAD for mid-level managers, and ALP for senior leaders. This structured progression ensures leadership continuity, builds internal bench strength, and reflects the best practices implemented by top-tier state DOTs nationwide.

*(c) Data-Driven Learning Management*

Training participation, hours, and outcomes (e.g., promotion and retention rates) are tracked using Cornerstone LMS and performance dashboards. These metrics allow for continuous program improvement and help justify investments to senior leadership [17].

### **3.5.2 Opportunities for Enhancement**

*(a) Micro-learning resources*

States are steadily augmenting traditional courses with bite-sized ( $\leq 60$  min) safety or equipment videos that technicians can access on demand, often via mobile devices. Expanding MDOT SHA's CBT library with similar micro-modules would provide convenient refresher training between formal classes and support just-in-time learning in the field.

*(b) Expanded credentialing and certification partnerships*

Several DOTs—including Montana and Idaho—have implemented statewide certification systems or registered apprenticeships tied to technician advancement. Incorporating external credentials (e.g., NCCER, OSHA-10, FEMA ICS) into the FMT ladder would reinforce workforce professionalism and create transferable career pathways.

*(c) Simulation and virtual learning tools*

DOTs such as Minnesota DOT and Virginia DOT have introduced snowplow driving simulators and heavy equipment VR modules to complement classroom and field instruction. MDOT SHA could explore incorporating similar technologies to reduce reliance on physical equipment and enhance training safety, particularly for new hires.

*(d) Public reporting of training outcomes*

Several DOTs, including WSDOT, have developed dashboards to report training investments and outcomes (e.g., promotion rate, turnover, emergency readiness). Publishing similar data could increase transparency, justify funding, and demonstrate the impact of workforce development programs across the agency.

## Chapter 4. Survey Methodology and Administration

### 4.1 Introduction

The research office and technical team at MDOT SHA has helped conduct a survey to the FMT groups, and this chapter presents the survey methodology, design, administration process, and resulting data used to evaluate job satisfaction and training program effectiveness among FMTs at MDOT SHA. In line with the project's objectives, two distinct sets of surveys were developed: one targeting FMTs and another designed for their trainers and supervisors. These surveys aimed to capture perceptions from both the learner and instructional perspectives, providing a well-rounded understanding of the training environment and workforce dynamics.

### 4.2 FMT Survey Design

The survey was circulated through multiple review rounds with MDOT SHA technical Lead of the project. Their feedback guided iterative refinements, including adjusting wording, adding or removing items, and reordering questions to ensure clarity, relevance, and completeness.

The survey's primary objective was to assess the impact of training experiences versus overall job satisfaction on the high turnover rates among FMTs. A mixed-methods instrument was employed, incorporating demographic information, standardized job satisfaction scales, and targeted training evaluations. The final questionnaire comprised three sections:

- ***Part I – Demographic Information:*** This section collected background information, including length of employment, current FMT level (I, II, III), CDL status upon entry, highest level of education, current shop assignment, and career advancement goals. These variables enable stratified analysis across different workforce segments.
- ***Part II – Job Satisfaction:*** This section evaluated satisfaction across several dimensions, such as professional growth opportunities, job fulfillment, compensation and benefits, workload, promotion opportunities, management quality, and internal communication.
- ***Part III – Training Program Evaluation:*** This section assessed two categories of training programs:
  1. Technical training provided by the Office of Maintenance (e.g., FMCSA, ATSSA certification, equipment training).

2. Professional development programs offered by the OD (e.g., PEP, Northbound 10, Facility Maintenance Experience).

Respondents were asked to evaluate aspects such as training sufficiency, clarity of materials, hands-on opportunities, trainer competence, and post-training support. Additional questions identified reasons for non-participation and suggestions for program improvement. The survey utilized a combination of multiple-choice questions, Likert-scale ratings, and open-ended questions to capture both quantitative metrics and qualitative feedback. This mixed-methods approach ensured a comprehensive understanding of FMT perspectives on job experience and training quality.

### 4.3 Trainer Survey Design

The trainer survey is designed to capture how trainers develop course materials, evaluate training outcomes, and track trainee performance afterward. It combines structured rating scales with open-ended questions to gather both quantitative evaluations and practical suggestions.

The final questionnaire comprised three sections:

- ***Part I – Demographic Information:*** This section gathered trainer background, including employing office or division (OOM or OD), current role (Team Leader, FMS 1, ARME, RME or above, other), and programs taught under each division.
- ***Part II – Training Program Perception:*** This section combined both structured and open-ended questions to assess the quality and impact of training. Using five-point scales, respondents evaluated whether they developed their own materials, the usefulness and relevance of provided materials, alignment with on-the-job tasks, overall training effectiveness, and clarity of advancement pathways. In addition, the section explored whether trainers monitored post-training performance (yes, no, sometimes), how they measured impact, and any observed improvements or success stories. Open-ended questions also invited respondents to share the most valuable training components and examples of particularly effective sessions. This trainer-focused survey complements the FMT survey by offering a parallel view from the instructional side.

While FMT survey shed light on learner experience and perceived value, trainer feedback provides critical insight into the intent, structure, and delivery of the training programs. Together, the two perspectives help identify alignment gaps, instructional strengths, and opportunities for improvement across the training ecosystem.

#### 4.4 Survey Administration

Both the FMT and trainer surveys were administered in two formats: an online version via Qualtrics and a printed paper version. This dual-format approach accommodated varying levels of digital access and ensured broad participation across field and administrative staff. Finalized surveys were provided in English and Spanish for FMTs and in English for trainers.

Survey distribution was facilitated by the MDOT SHA Technical Lead, the OD, and the Unit Training Coordinators (UTCs) at each district. Prior to distribution, a coordination meeting was held with all UTCs to explain their responsibilities. During the session, the importance of their support in distributing surveys, assisting respondents, and promoting participation was emphasized. Then, both paper copies and online links were distributed during the week of June 17. Respondents were given 30 days to complete the survey, with an additional 30-day grace period offered to accommodate any logistical delays. A promotional flyer was developed to support the campaign and encourage participation (Figure 8). The flyer featured survey QR codes, UTC contact guidance, and a summary of confidentiality assurances and response deadlines.

To encourage participation, an incentive competition was introduced: the shop with the highest participation rate, calculated as the ratio of completed surveys to the total number of FMTs at that shop, would receive a group lunch.

A total of 146 valid responses were collected from FMTs and 35 from trainers.

# Got a minute?

We want your FEEDBACK!



All responses are confidential and will improve YOUR training programs

Let us know your thoughts!  
Your opinions matter!

Surveys are open  
June 17 -  
August 16

FMT



Scan your QR Code  
or speak with your  
UTC today to take  
the survey in-person  
or online



FMT Supervisor



Figure 8: Flyer distributed to FMTs and supervisors to promote survey participation

## Chapter 5. Job Satisfaction of FMTs

### 5.1 Introduction

This chapter presents the results of the job satisfaction survey conducted among FMTs. It begins with a demographic overview of respondents and summarizes qualitative feedback regarding their professional development goals. Next, employee satisfaction is quantitatively assessed using a six-point Likert scale across five areas: Professional Growth, Happiness, Payment/Benefits, Promotion, and Management. Statistical indicators, including median, mode, mean, and variance, are used to highlight overall trends as well as individual variations in responses. The analysis then explores how overall job satisfaction differs by employment duration and career level. Additionally, results from an internal job exit survey conducted between March and July 2023 are included to identify potential factors contributing to voluntary turnover. Finally, key findings are synthesized, and targeted recommendations are provided to enhance job satisfaction and workforce stability among the FMTs.

### 5.2 Respondent Background Overview

#### 5.2.1 Respondent Demographics

Figure 8 summarizes key demographic characteristics of the FMTs who participated in the survey, focusing on employment duration, current job role, CDL status prior to employment, and career aspirations.

##### (a) Employment Duration

The largest group of respondents reported over five years of service with the State of Maryland (47 respondents), followed by those with 1–2 years (32), 2–5 years (29), 6–12 months (21), and 1–6 months (16).

##### (b) Current Role

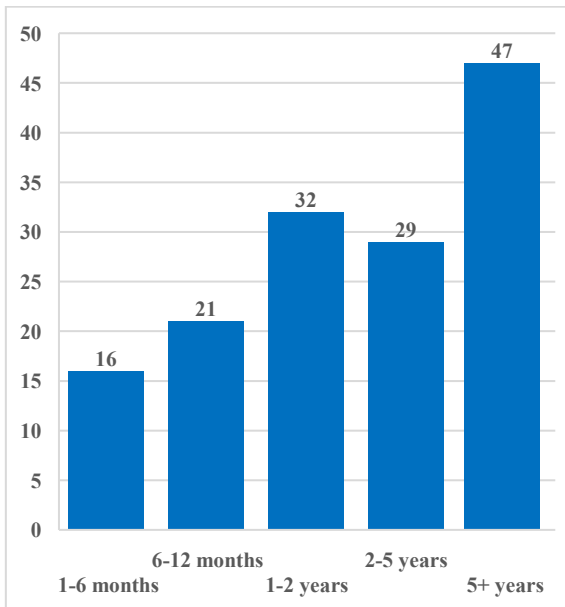
Participants were almost evenly distributed across all three FMT levels, 53 in FMT III, 44 in FMT II, and 49 in FMT I, showing only slight variation among the FMT levels.

##### (c) Prior CDL Status

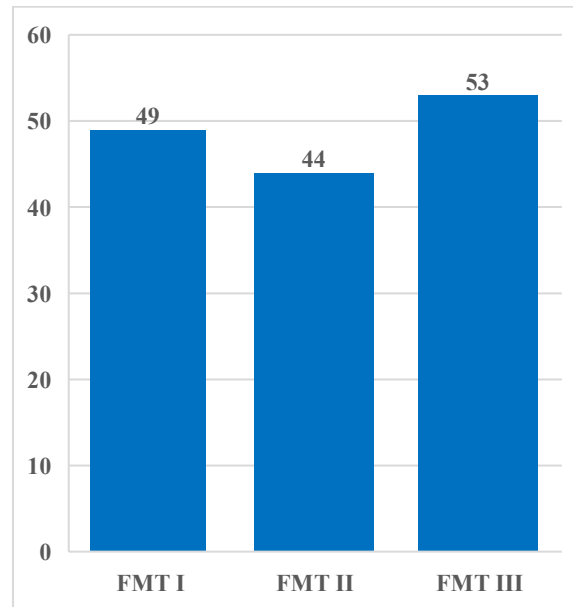
Most respondents (107) did not hold a CDL before joining MDOT SHA, while 38 had obtained one prior to employment.

*(d) Career Aspirations*

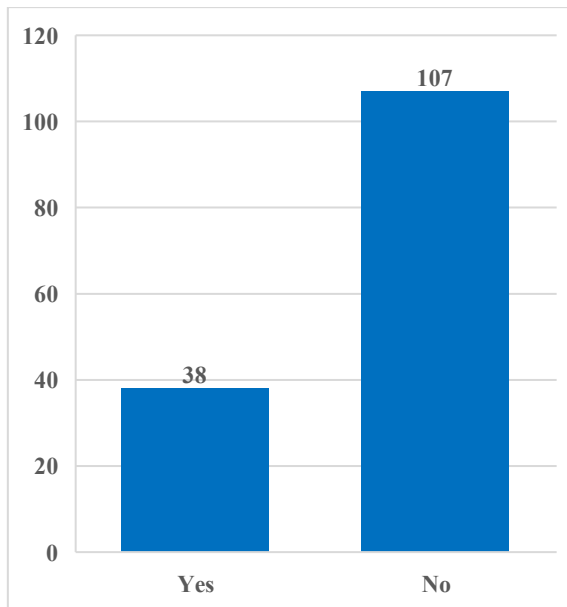
When asked about their intended career progression over the next five years, the most common goal was to become a Team Leader (55 respondents), followed by advancement to FMS-1 (32), continued progression within the FMT series (29), RME or above (13), and ARME (8). Additionally, 26 respondents selected “Others,” with open-ended responses indicating plans to retire, pursue technical roles such as Bridge Inspector or TET, or transition into areas like Procurement and Inspection. A few expressed uncertainty (e.g., “TBD” or “?”), while others indicated contentment with their current position (e.g., “I’m good”).



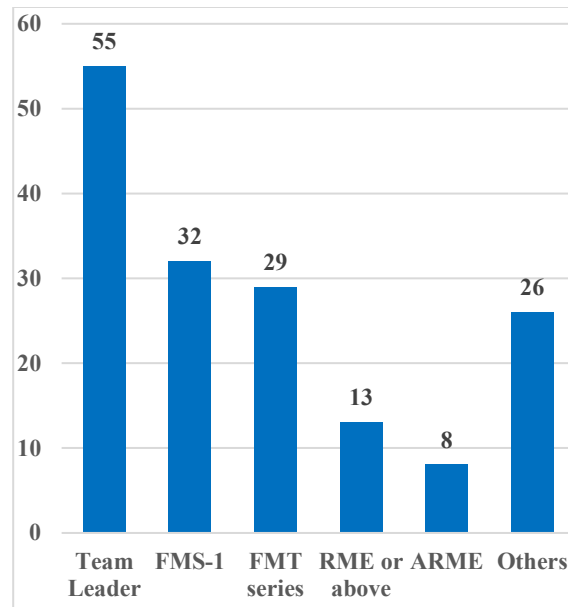
(a) How long have you been employed by the State of Maryland?



(b) What is your current role in your career?



(c) Did you have your CDL before coming into MDOT SHA?



(d) In the next 5 years, how far would you like to progress in your career?

**Figure 9:** Respondents profile overview

### 5.2.2 Open-ended Question: Professional Goals

In response to the open-ended question, “How can MDOT SHA assist with your development to reach your professional goals?”, survey participants provided a wide range of suggestions. Their feedback revealed six primary themes, which are summarized below.

#### (a) Increase Training Opportunities

The most frequently cited need was for more training—particularly hands-on training, diverse topics, and frequent offerings. Respondents emphasized the importance of year-round or continuous training cycles, rather than limited or infrequent offerings. Winter was frequently suggested as an ideal time for technical and leadership instruction due to reduced operational workload. Several participants requested faster onboarding and more responsive access to equipment training.

#### (b) Mentorship

Many employees highlighted the value of mentorship from experienced staff and the opportunity to shadow colleagues currently in advanced positions. This peer-guided approach was seen as critical to bridging the gap between formal training and real-world application, particularly for those pursuing promotions.

#### (c) Streamlined Certification

A number of respondents expressed frustration with delays in certification processes, citing red tape and lack of scheduling flexibility. Suggestions included fast-tracking certification for experienced personnel, minimizing procedural delays, and offering more online training options to support credentialing goals.

*(d) Clear Advancement Pathways*

Employees expressed a strong desire for transparent and structured promotion frameworks. Suggestions included clearer steps for advancement, study guides for written exams, and better integration of career goals into Professional Development Plans (PDPs). Several responses noted that current PDPs focus too heavily on required tasks, rather than enabling individual career growth.

*(e) Better Communication and Support*

Communication gaps were frequently mentioned, particularly regarding training schedules, certification timelines, and advancement processes. Respondents called for stronger coordination from HR and leadership, and some proposed dedicated training personnel in each shop to improve local access and oversight.

*(f) Expanded Educational Resources*

A portion of the workforce also requested tuition support, college partnerships, and more online learning opportunities. Some respondents advocated for multi-language training materials to support non-native English speakers and ensure equitable access to information.

In summary, the responses reflect a workforce that is motivated to learn and grow, but often hindered by limited access, unclear advancement criteria, and inconsistent support. Addressing these concerns, particularly around training availability, hands-on learning, mentorship, and communication, can significantly improve employee satisfaction.

### **5.3 Likert Scale Questions for Job Satisfaction**

As shown in [Table 11](#), the job satisfaction survey covered five key topic areas: Professional Growth, Happiness, Payment/Benefits, Promotion, and Management. For each statement, respondents rated their level of agreement using a six-point Likert scale, where:

*1 = disagree very much, 2 = disagree moderately, 3 = disagree slightly, 4 = agree slightly, 5 = agree moderately, 6 = agree very much.*

To provide a comprehensive view of employee sentiment, each item is accompanied by four statistical indicators: median, mode, mean, and variance. The ones with lowest

ratings are highlighted in red and those with the highest ratings are indicated in green. These metrics offer insights into overall trends and variability, supporting data-driven analysis and identifying areas for targeted improvement.

**Table 12:** Summary of Job Satisfaction Ratings Across Five Key Topics

Topic	Statement	Median	Mode	Mean	Var
Professional Growth	I feel that my job allows me to develop new skills	4	6	4.1	2.34
	I feel like my job utilizes my skills as much as it could	4	4	3.66	2.21
	I feel that MDOT SHA offers good chances for promotions and moving up	4	4	3.55	2.7
Happiness	I feel like my work matters and people appreciate it	4	4	3.73	2.4
	I have the safety equipment, tools, and training to do my job right	4	4	4.24	1.99
	My workload feels about right, not too crazy	4.5	4	4.42	1.74
	It seems like everyone on my team gets a fair share of the work	4	5	3.67	2.84
	I'd encourage my friends to work here	4	5	4.04	2.61
	If I had to start over, I'd choose this job again	4	6	4.1	2.6
Payment/ Benefits	I feel my salary is adequate for the work I do	3	1	2.82	2.51
	I know about MDOT SHA's Advanced Education Program and its benefits	3	1	3.3	2.91
	I know about MDOT SHA's employer match 401k Program and its benefits	5	6	4.61	1.83
	SHA's health insurance is good compared to others	5	6	4.89	1.45
	I get leave time when I need it	6	6	5.16	1.49
Promotion	If you do well, you have a good chance of getting promoted	4	4	3.41	2.6
	People get promoted as fast as they do in other places	3	3	3.13	2.37
Management	The management is competent and transparent	4	3	3.79	2.27
	My direct supervisor (Team Leader) asks for feedback and values it when it is offered	5	6	4.27	2.52
	The upper supervisors (FMS, ARME, RME) ask for feedback and value it when it is offered	4	6	3.85	2.94
	My direct supervisor (Team Leader) appreciates what I do	5	6	4.76	2.1
	The upper supervisors (FMS, ARME, RME) appreciate what I do	5	6	4.32	2.45
	Communication seems good within this organization	3	1	3.28	2.73

### 5.3.1 Professional Growth

✚ Statement: I feel that my job allows me to develop new skills.

*Median: 4, Mode: 6, Mean: 4.1, Variance: 2.34*

Most respondents agree their roles help them acquire or refine skills, as shown by the mean score above 4 and a mode of 6 (indicating a solid group of strong supporters). While the variance of 2.34 suggests responses are moderately spread out, the overall sentiment is that employees appreciate the skill-building opportunities their jobs provide.

✚ Statement: I feel like my job utilizes my skills as much as it could.

*Median: 4, Mode: 4, Mean: 3.66, Variance: 2.21*

Although many respondents still lean positive here, the average rating of 3.66 is notably lower than the previous statement. This suggests that, while employees find their roles valuable, some feel they are not fully tapping into their abilities. The variance of 2.21 reflects moderate differences in opinion about whether their skills are being maximized.

✚ Statement: I feel that MDOT SHA offers good chances for promotions and moving up.

*Median: 4, Mode: 4, Mean: 3.55, Variance: 2.70*

This statement has the lowest mean in this category (3.55), indicating a more reserved view of advancement opportunities. The median and mode of 4 imply mild agreement overall, but the higher variance (2.70) reveals a wide range of perspectives. Some employees appear confident in their chances for promotion, while others are less optimistic.

Overall, the Professional Growth category reflects a generally positive outlook on skill development, though opinions vary on how fully employees' skills are being utilized. Meanwhile, perceptions of promotion prospects are somewhat mixed, suggesting that more clarity or support for advancement could strengthen this aspect of professional growth.

### 5.3.2 Happiness

✚ Statement: I feel like my work matters and people appreciate it.

*Median: 4, Mode: 4, Mean: 3.73, Variance: 2.4*

Most respondents lean toward agreement, though the mean of 3.73 indicates moderate positivity rather than a strong endorsement. The modest variance suggests some variation in how recognized employees feel, but not to an extreme degree.

✚ Statement: I have the safety equipment, tools, and training to do my job right.

*Median: 4, Mode: 4, Mean: 4.24, Variance: 1.99*

This statement earns one of the higher mean scores in the Happiness category (4.24), suggesting that employees generally agree they have the resources they need. The lower variance of 1.99 implies a fairly consistent view across respondents.

✚ Statement: My workload feels about right, not too crazy.

*Median: 4.5, Mode: 4, Mean: 4.42, Variance: 1.74*

This item has the highest average rating in the Happiness category, with many employees satisfied by their workload level. A median of 4.5 reinforces this overall positivity, while the relatively low variance indicates minimal disagreement about workload demands.

✚ Statement: It seems like everyone on my team gets a fair share of the work.

*Median: 4, Mode: 5, Mean: 3.67, Variance: 2.84*

Compared to other happiness indicators, this statement's mean is somewhat lower (3.67), and it shows the highest variance (2.84) in this group. While a subset strongly agrees (mode of 5) that workload is fairly shared, others appear more neutral or negative, reflecting broader differences in team experiences.

✚ Statement: I'd encourage my friends to work here.

*Median: 4, Mode: 5, Mean: 4.04, Variance: 2.61*

A mean above 4 suggests that, on balance, respondents feel positive enough to recommend their jobs to friends. However, the variance of 2.61 indicates varying degrees of enthusiasm, with some employees far more likely than others to spread the word.

✚ Statement: If I had to start over, I'd choose this job again.

*Median: 4, Mode: 6, Mean: 4.1, Variance: 2.6*

Although the average sits just above 4, a mode of 6 (strong agreement) shows that a significant number of employees are very satisfied with their choice of job. At the same time, the variance of 2.6 signals that not everyone shares the same level of confidence.

These results suggest that while most employees feel recognized, well-supported with essential resources, and comfortable with their workload, perceptions of fair task distribution vary considerably. Many participants would both encourage friends to work here and choose their job again, yet a segment of the workforce remains more reserved.

### 5.3.3 *Payment/Benefits*

✚ Statement: I feel my salary is adequate for the work I do.

*Median: 3, Mode: 1, Mean: 2.82, Variance: 2.51*

With the lowest mean in the entire survey, this statement indicates that many respondents view their salary as insufficient. The mode of 1 (strong disagreement) underscores a substantial group's dissatisfaction with current pay levels, while the relatively high variance signals a range of opinions.

✚ Statement: I know about MDOT SHA's Advanced Education Program and its benefits.

*Median: 3, Mode: 1, Mean: 3.3, Variance: 2.91*

Awareness of the Advanced Education Program appears modest. At a mean of 3.3, respondents hover around neutral, while a mode of 1 suggests that many are largely unaware or unconvinced of its advantages. The higher variance points to considerable differences in how much participants know about or value this program.

✚ Statement: I know about MDOT SHA's employer match 401k Program and its benefits.

*Median: 5, Mode: 6, Mean: 4.61, Variance: 1.83*

Compared to the Advanced Education Program, this benefit is better known and more appreciated, as reflected by a mean of 4.61 and a mode of 6. The relatively low variance suggests broad consistency in awareness and satisfaction with the employer match 401k option.

✚ Statement: SHA's health insurance is good compared to others.

*Median: 5, Mode: 6, Mean: 4.89, Variance: 1.45*

Employees generally view the health insurance package positively. A mean nearing 5 and a mode of 6 point to strong approval. The low variance here indicates that most respondents share similar, favorable opinions on health insurance benefits.

✚ Statement: I get leave time when I need it.

*Median: 6, Mode: 6, Mean: 5.16, Variance: 1.49*

This item earns both the highest mean and a unanimous mode of 6, showing that employees strongly agree they can take leave as needed. The minimal variance further confirms that flexible leave is one of the most widely appreciated aspects of the compensation package.

Payment and Benefits present a mixed picture. While leave policies and health insurance receive strong praise, salary remains a point of concern. Awareness and utilization of certain benefits (like the Advanced Education Program) also vary considerably.

### 5.3.4 Promotion

✚ Statement: If you do well, you have a good chance of getting promoted.

*Median: 4, Mode: 4, Mean: 3.41, Variance: 2.60*

Most employees lean slightly toward agreement here, suggesting that solid performance is viewed as a key factor in advancement. However, the mean of 3.41 indicates only moderate confidence in this belief, while the variance points to differing experiences and opinions across respondents.

✚ Statement: People get promoted as fast as they do in other places.

*Median: 3, Mode: 3, Mean: 3.13, Variance: 2.37*

With a mean of 3.13, this statement reflects a more neutral to mildly negative stance on promotion speed. The median and mode, both at 3, suggest that some employees feel promotional timelines lag behind other organizations, while others are uncertain or have had more positive experiences.

These two items highlight cautious optimism about promotion opportunities. While many respondents believe strong job performance can lead to advancement, there is less certainty about how quickly those promotions happen compared to external benchmarks.

### 5.3.5 Management

✚ Statement: The management is competent and transparent.

*Median: 4, Mode: 3, Mean: 3.79, Variance: 2.27*

While the average rating leans toward mild agreement, the mode of 3 suggests a portion of employees remain neutral or somewhat skeptical about management's openness and capabilities. A moderate variance (2.27) indicates differing perspectives across the workforce.

✚ Statement: My direct supervisor (Team Leader) asks for feedback and values it when it is offered.

*Median: 5, Mode: 6, Mean: 4.27, Variance: 2.52*

A mean of 4.27 suggests that many respondents feel heard by their immediate supervisors. The mode of 6 (strong agreement) highlights a core group of employees who strongly endorse this statement, although the variance shows that not everyone shares the same level of confidence.

✚ Statement: The upper supervisors (FMS, ARME, RME) ask for feedback and value it

when it is offered.

*Median: 4, Mode: 6, Mean: 3.85, Variance: 2.94*

The mean here is slightly lower than for direct supervisors. The larger variance (2.94) points to a wide range of experiences, indicating that interactions may depend on the specific team or leadership style.

✚ Statement: My direct supervisor (Team Leader) appreciates what I do.

*Median: 5, Mode: 6, Mean: 4.76, Variance: 2.1*

At 4.76, this statement has one of the highest averages in the Management category, suggesting employees generally feel valued by their immediate supervisors. The relatively low variance implies a more consistently positive experience.

✚ Statement: The upper supervisors (FMS, ARME, RME) appreciate what I do.

*Median: 5, Mode: 6, Mean: 4.32, Variance: 2.45*

Though still positive, the mean here (4.32) is lower than for direct supervisors. The variance of 2.45 shows some employees feel strongly recognized by higher-level leaders, while others are more neutral or uncertain.

✚ Statement: Communication seems good within this organization.

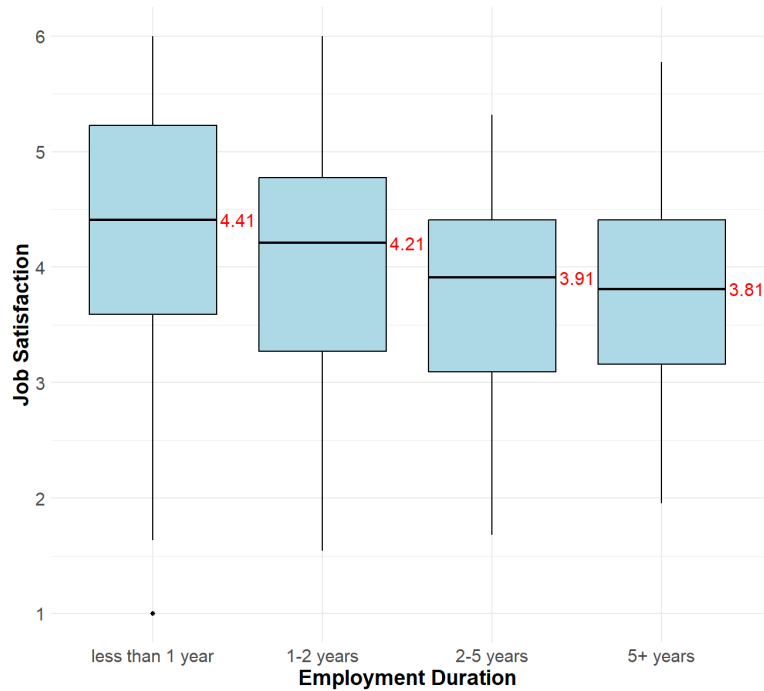
*Median: 3, Mode: 1, Mean: 3.28, Variance: 2.73*

With the lowest mean in this category (3.28), communication emerges as a potential issue. The mode of 1 (strong disagreement) suggests a notable group of employees sees significant room for improvement, though others adopt a more neutral or mildly positive view.

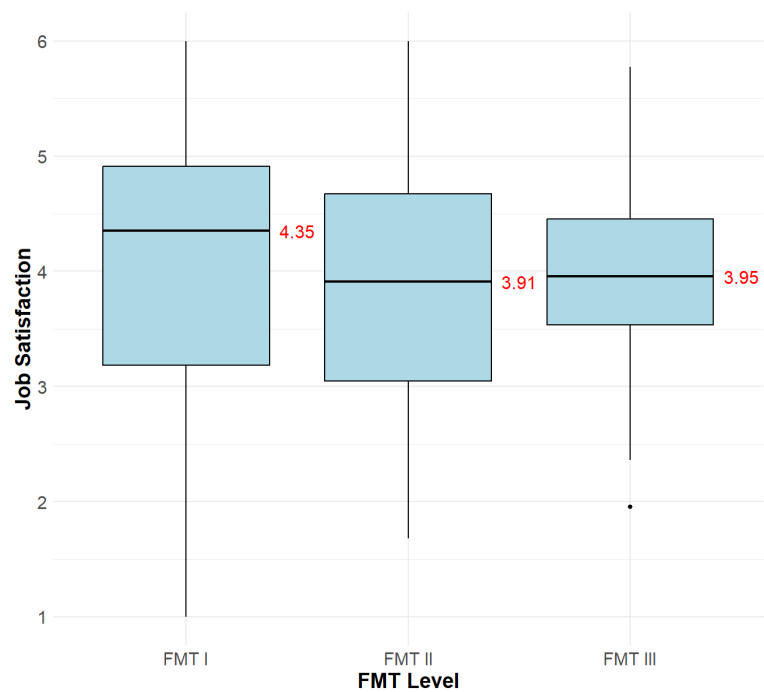
While direct supervisors generally receive higher marks for feedback and appreciation, perceptions of upper-level management vary more widely. Communication emerges as a consistent concern, indicating that efforts to increase transparency and engagement could further boost morale and trust.

## 5.4 Discussions

To explore potential trends in job satisfaction across the employee tenure and career stage, box plots were created to visualize the distribution of overall satisfaction scores. [Figure 9](#) presents these distributions based on two variables: (a) employment duration and (b) current FMT level.



(a) Job Satisfaction by Employment Duration



(b) Job Satisfaction by FMT Level

**Figure 10:** Boxplots of Job Satisfaction Scores

Figure 9 (a) presents a box plot of job satisfaction stratified by employment duration, grouped into four ordered categories: less than 1 year, 1–2 years, 2–5 years, and more than 5 years. A downward trend in median satisfaction scores is observed as employment

duration increases. Specifically, respondents employed for less than 1 year report the highest median satisfaction (4.41), followed by those with 1–2 years (4.21), 2–5 years (3.91), and 5+ years (3.81). This pattern suggests a potential decline in perceived job satisfaction over time. The interquartile ranges (IQRs) are substantial in all groups, indicating variability in individual experiences. Nonetheless, the narrowing of the upper quartile in longer-tenured groups may reflect a ceiling effect in satisfaction or stabilization of perceptions over time. The presence of mild outliers in some groups further underscores the heterogeneity of responses, though they are relatively infrequent.

These results imply that job satisfaction may be highest during the early stages of employment, potentially reflecting initial engagement, optimism, or onboarding support. The observed decrease among longer-tenured employees could warrant further investigation into retention-related factors such as career development, promotion opportunities, or burnout.

Figure 9 (b) displays the distribution of job satisfaction across three FMT career stages: FMT I, FMT II, and FMT III. The highest median satisfaction is found among FMT I employees (4.35), with FMT II and FMT III showing slightly lower medians (3.91 and 3.95, respectively). While the differences in median values are not pronounced, the trend aligns with the pattern seen in the tenure-based analysis. The spread of satisfaction scores remains wide across all FMT levels, with interquartile ranges covering approximately one full scale point in each group. This suggests that satisfaction is not uniform within rank and may depend on other contextual or personal factors. A small number of low-end outliers were observed, particularly in the FMT III group.

Taken together, these results indicate that job satisfaction may decline slightly as employees advance in tenure or rank. Possible explanations include increased job expectations, limited promotion opportunities, or declining novelty of the work environment. Although the differences are modest, they may have practical implications for workforce development and employee morale.

## 5.5 Existing Job Exit Survey

Supplementing the findings from the primary FMT satisfaction survey, the results of an internal job exit survey provided by MDOT SHA offer additional insights into employee departures. This analysis includes exit surveys conducted between March and July 2023, capturing feedback from 13 FMTs and a broader group of 52 SHA employees, of whom 15 resigned voluntarily.

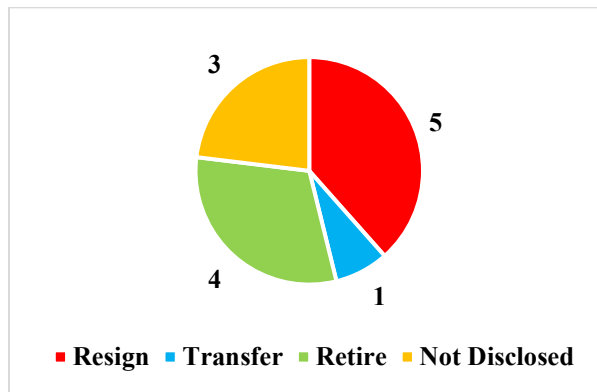
Figure 10 (a) illustrates the reasons for leaving among the FMTs. Of the five who resigned, the most common reasons cited were working conditions (3 responses), followed

by family reasons (2) and better opportunities elsewhere (1). Other exits were due to retirement (4), transfer (1), or were not disclosed (3). These responses echo concerns raised in earlier survey sections, particularly regarding working conditions.

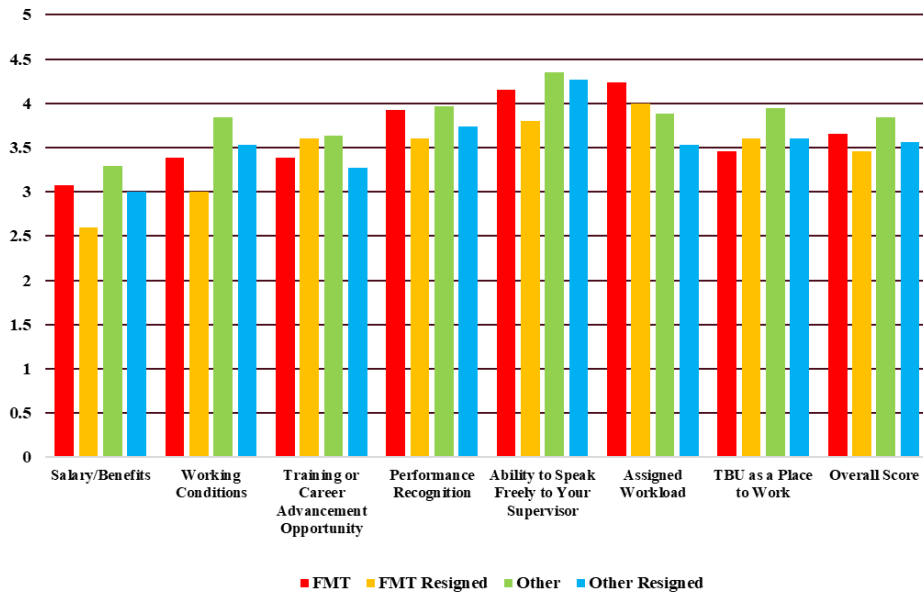
Figure 10 (b) compares satisfaction scores across a range of workplace dimensions (e.g., salary/benefits, training opportunities, supervisor communication) for four distinct groups:

- FMTs who transferred or retired (other)
- FMTs who resigned
- Other SHA employees who transferred or retired (other)
- Other SHA employees who resigned

Across nearly every category, FMTs who resigned report the lowest satisfaction scores, especially in salary/benefits, training and advancement opportunities, and assigned workload. Their overall satisfaction is also lower than that of transferred or retired FMTs and other employee groups. This reinforces the notion that dissatisfaction, particularly around growth opportunities and compensation—may contribute directly to voluntary turnover. Interestingly, transferred or retired FMTs and other SHA employees both show higher average ratings in areas like supervisor communication and recognition, which may play a role in retention. Notably, resigned non-FMT employees appear to score slightly higher than resigned FMTs in several dimensions, potentially suggesting job-specific challenges unique to the FMT role.



(a) Reasons for leaving



(b) Average satisfaction scores across multiple dimensions for four groups

**Figure 11: Job Exit Analysis for FMT and Other SHA Employees**

## 5.6 Summary

This chapter explored job satisfaction among FMTs through both a dedicated survey to active FMTs and supplemental job exit survey from MDOT SHA. Across multiple sections, a number of common patterns emerged that point to opportunities for improving employee experience and retention.

Quantitative analysis of Likert-scale responses revealed relatively high satisfaction in areas such as leave flexibility, health insurance, and recognition from direct supervisors. However, employees expressed lower satisfaction with salary, promotion speed, and internal communication. These trends were consistent across all FMT levels. Open-ended feedback provided further context, emphasizing the need for more frequent and hands-on training, mentorship, and clearer advancement pathways. Respondents also voiced concerns about delays in certification processes and inconsistent access to professional development resources.

Boxplot analyses highlighted a gradual decline in job satisfaction as tenure and rank increased. Employees with less than one year of service reported the highest satisfaction, while those with five or more years gave lower ratings, suggesting a potential drop in engagement over time. Finally, insights from MDOT SHA’s internal job exit survey supported these findings. FMTs who resigned between March and July 2023 cited working conditions and limited advancement as key reasons for leaving. Satisfaction ratings from these

individuals were lower across nearly every category compared to their retired or transferred peers, reinforcing the importance of addressing systemic concerns.

Together, these results point to several critical areas for strategic improvement, particularly around training accessibility, career growth support, compensation, and organizational communication. Addressing these factors will be essential for enhancing job satisfaction and improving workforce stability within the FMT series.

## **Chapter 6. Evaluation of Current FMT Training Program**

### **6.1 Introduction**

This chapter presents the results of the evaluations of the current training programs provided to FMTs at MDOT SHA, based on feedback gathered through two surveys: one was distributed to FMTs and the other was to trainers responsible for delivering the courses. The evaluation aims to assess the effectiveness, accessibility, and overall value of the training from both trainee and trainer perspectives.

The chapter is organized into three primary sections. Section 5.2 analyzes trainee feedback on the OOM Training Program, which focuses on operational skills, equipment handling, and related certifications. Section 5.3 then covers trainee feedback on the OD Training Program, emphasizing professional development skills such as leadership, communication, and career planning. Both sections present quantitative ratings alongside qualitative insights from open-ended comments, highlighting strengths and opportunities for improvement. Section 5.4 shifts to the trainer perspective, summarizing responses from those directly involved in providing instruction. This trainer feedback complements the trainee insights, adding context about instructional effectiveness, practical challenges, and potential enhancements.

Taken collectively, the insights from both FMTs and trainers provide a well-rounded view of the current state of MDOT SHA's training programs, informing targeted strategies to improve workforce engagement, professional development, and retention within the FMT workforce.

### **6.2 Perception from the Trainee Perspective - Office of Maintenance Training Program Feedback**

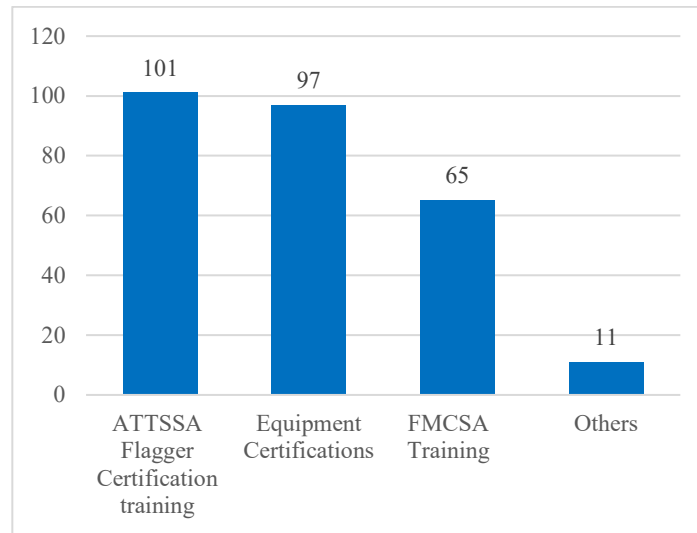
#### ***6.2.1 Training Program Satisfaction***

To start the evaluation of training programs offered by the OOM, respondents were asked to indicate the specific trainings they have attended or are currently participating in. [Figure 11](#) summarizes these results.

The most widely attended training was the ATTSSA Flagger Certification, with 101 respondents reporting participation. This was closely followed by Equipment Certification training, indicated by 97 respondents, reflecting MDOT SHA's strong emphasis on operational skills and equipment handling. Additionally, 65 respondents reported participation

in FMCSA Training, underscoring its significance for regulatory compliance.

Eleven respondents indicated participation in training classified as "Other." Within this category, several specified trainings included Pesticide Certification, Tree Care Expert, Traffic Control and Management, and Cornerstone Online Learning. A few respondents noted "None" or "N/A," suggesting they had not participated in training beyond the primary listed options.



**Figure 12:** Training program participated

Table 13 presents the median, mode, mean, and variance of FMTs’ level of agreement of the statements, measured on a six-point Likert scale, regarding training programs provided by OOM.

**Table 13:** Trainee Satisfaction with Office of Maintenance Training Program

Topic	Statement	Median	Mode	Mean	Var
Training Experience	The training opportunities provided are sufficient for my needs to perform the job well and safely	4	5	4.21	1.86
	I can choose from different training types that fit what I like and can do	4	4	3.48	2.52
	The training program supports my advancement opportunities	4	4	3.91	2.21
	The training materials are complete and clear	4	5	3.92	2.1
	The training sessions are well-organized and structured	4	4	3.62	2.4
	I am happy with the amount of hands-on practice during training	4	5	4.07	2.3
	The trainers know a lot and are easy to talk to	4	6	4.3	2.13

The trainers talk clearly and involve us during the training	4.5	6	4.34	2.05
I am able to give feedback and ask questions during training	5	6	4.73	1.77
When I apply what I learned from training, I get enough support	5	5	4.3	1.94
I'm happy with the follow-up I get after training	4	4	3.88	2.39

- ✚ Statement: The training opportunities provided are sufficient for my needs to perform the job well and safely.

*Median: 4, Mode: 5, Mean: 4.21, Variance: 1.86*

Responses indicate that participants generally agree they receive adequate training to perform their jobs safely and effectively. The relatively low variance suggests consistent sentiment across most respondents.

- ✚ Statement: I can choose from different training types that fit what I like and can do.

*Median: 4, Mode: 4, Mean: 3.48, Variance: 2.52*

This statement's lower mean reflects a somewhat mixed outlook on variety and flexibility in training options. The higher variance indicates that while some respondents are satisfied with the range of training types, others may feel more limited in their choices.

- ✚ Statement: The training program supports my advancement opportunities.

*Median: 4, Mode: 4, Mean: 3.91, Variance: 2.21*

Most respondents lean toward the agreement that training aids career growth, as shown by the median of 4. However, the mean is slightly below 4, suggesting that a portion of participants view advancement support as moderate rather than strongly evident.

- ✚ Statement: The training materials are complete and clear.

*Median: 4, Mode: 5, Mean: 3.92, Variance: 2.1*

Clarity and comprehensiveness of training materials tend to be positively rated. The mean of 3.92 and a mode of 5 indicate that many respondents find the materials helpful, though experiences still vary to a degree. Most respondents agree that the materials are clear, but there remains moderate variability, suggesting some still experience gaps in completeness or clarity.

- ✚ Statement: The training sessions are well-organized and structured.

*Median: 4, Mode: 4, Mean: 3.62, Variance: 2.4*

Responses here lean positive, but the mean is slightly lower compared to other statements. The variance of 2.4 suggests differing perspectives on session organization, with some participants potentially finding improvements necessary.

✚ Statement: I am happy with the amount of hands-on practice during training.

*Median: 4, Mode: 5, Mean: 4.07, Variance: 2.3*

Most respondents appreciate the hands-on component, reflected in a mean above 4. The mode of 5 highlights a number of respondents who strongly value practical, interactive sessions. Variance indicates responses are slightly spread. In practical terms, most trainees feel they get adequate hands-on sessions, but some still want even more field-based practice or deeper skill drills.

✚ Statement: The trainers know a lot and are easy to talk to.

*Median: 4, Mode: 6, Mean: 4.3, Variance: 2.13*

Trainer expertise and approachability received a comparatively high score, indicating that employees generally find instructors knowledgeable and approachable. A mode of 6 suggests a subset of respondents who strongly endorse this view. The variance indicates moderate spread, that most trainees share this view, though some feel less supported.

✚ Statement: The trainers talk clearly and involve us during the training.

*Median: 4.5, Mode: 6, Mean: 4.34, Variance: 2.05*

Communication quality from trainers received another strong rating, suggesting that many participants feel actively engaged during sessions. The median of 4.34 and mode of 6 emphasize widespread approval of trainers' presentation skills.

✚ Statement: I am able to give feedback and ask questions during training.

*Median: 5, Mode: 6, Mean: 4.73, Variance: 1.77*

This statement has one of the highest means in the Training Experience set, indicating that employees believe they can interact freely with trainers. The notably low variance suggests consistent agreement that feedback and questions are encouraged.

✚ Statement: When I apply what I learned from training, I get enough support.

*Median: 5, Mode: 5, Mean: 4.3, Variance: 1.94*

A mean above 4 implies that, on the whole, participants feel they receive adequate help in putting new skills into practice. A median and mode of 5 underscore a strong endorsement from many respondents.

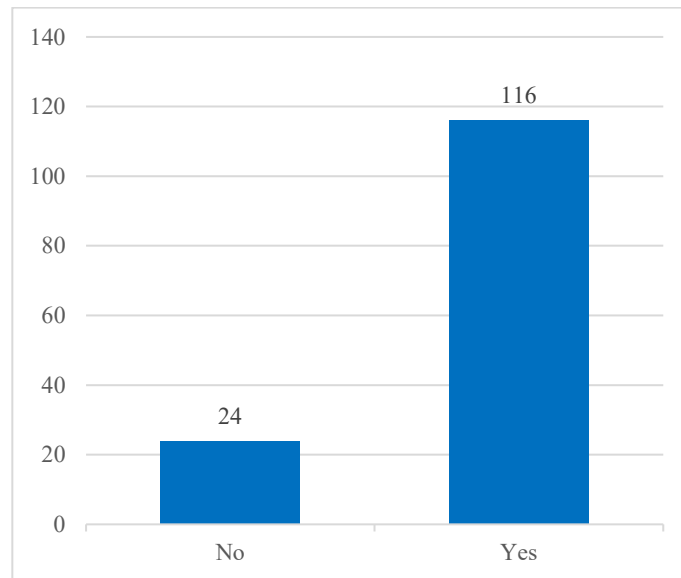
✚ Statement: I'm happy with the follow-up I get after training.

*Median: 4, Mode: 5, Mean: 3.88, Variance: 2.39*

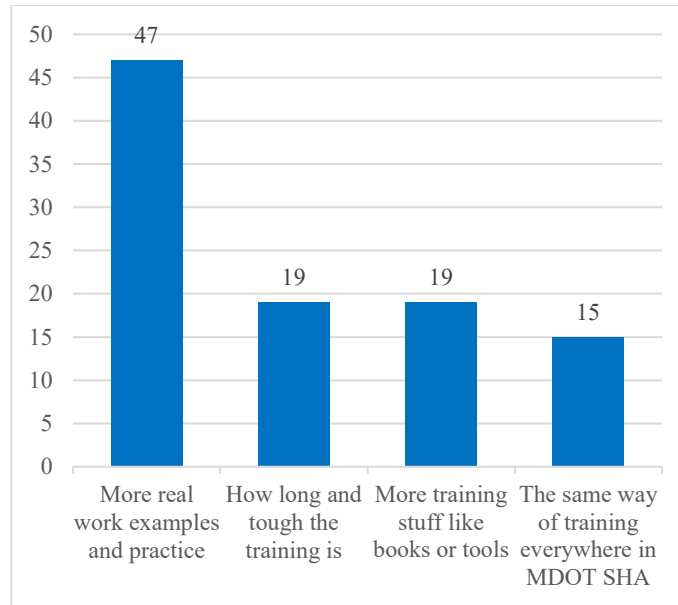
A mean near 4 indicates generally positive feelings about post-training follow-up, though relatively higher variance shows some variance in how respondents perceive this.

### 6.2.2 Potential improvements identified by FMTs

Figure 12 presents employee perspectives on the current MDOT SHA training program, offering both a general assessment of whether changes are needed and specific recommendations for improvement. In Figure 12 (a), a substantial majority of respondents (116 out of 140, or approximately 83%) indicated that they believe the training program should be improved or changed. This overwhelming consensus underscores widespread dissatisfaction or perceived inefficiencies within the existing program.



(a) I think the training program should be improved or changed.



(b) what parts of the training programs could be improved to better support your job performance?

**Figure 13:** FMT perceptions on the need for training program changes

Figure 12 (b) delves into the specific components that employees feel warrant improvement. The most commonly cited suggestion, cited by 47 respondents, was to include more real-world examples and hands-on practice in the training curriculum. While this represents a significant portion of the feedback, it does not constitute a majority of all 146 responses. Still, the emphasis on practical, field-based instruction is consistent with themes found throughout the qualitative data, where employees repeatedly expressed a preference for experiential learning over classroom-based or theoretical approaches.

Two other categories received equal mention (19 responses each): the perceived difficulty and length of the training, and the need for more instructional resources such as books or tools. These concerns may reflect both logistical constraints and inconsistencies in material quality or availability. Additionally, 15 respondents highlighted the need for standardized training practices across all MDOT SHA districts, suggesting that variability in training delivery contributes to inconsistency in employee preparedness and advancement opportunities.

### 6.2.3 Open-ended Question: Training Program Improvement

When asked for recommendations on “What other improvements or changes would you suggest for the training program?”, respondents highlighted several common concerns, grouped into four main themes: program scheduling and structure, trainer effectiveness, quality of training materials, and clarity around career advancement. These responses reveal areas where targeted changes could significantly enhance the effectiveness, fairness,

and relevance of current training practices.

- *Program Structure and Scheduling*

One frequent suggestion involved improving the timing and flexibility of training sessions. Employees expressed frustration with delays between completing training and taking related certification exams, sometimes spanning weeks. These delays reportedly reduced skill retention and negatively impacted morale. Respondents proposed scheduling training and certifications based on seasonal workloads and employee readiness, rather than trainer availability alone.

Another common request was to decentralize training operations. Participants felt strongly that each district should manage its training locally to minimize logistical challenges and disruptions caused by traveling to centralized locations. They argued this approach would better accommodate local needs and streamline the overall training process.

- *Effective Delivery and Qualified Trainers*

Some participants also raised concerns about inconsistencies in trainer quality and engagement. They observed that individuals were often assigned as trainers without standardized qualifications or sufficient instructional preparation, leading to uneven training experiences across districts. Respondents recommended formalizing trainer roles through structured credentialing processes, such as mandatory completion of "Train-the-Trainer" courses.

There was also significant feedback regarding trainers' commitment and teaching methods. Respondents emphasized a strong preference for hands-on, practical instruction over written assessments, and noted that trainers sometimes showed uneven attention to trainees or were occasionally absent during critical sessions. Employees felt hands-on experiences more closely resembling actual job tasks would greatly enhance training effectiveness.

- *Quality and Relevance of Training Materials*

A few respondents pointed out that training manuals and materials were outdated, failing to reflect the current equipment and techniques used on the job. Employees strongly recommended updating instructional content to better match real-world operations and the latest technology. Specific suggestions included modernized training handbooks, consistent step-by-step walkthroughs (especially for CDL training), and readily accessible on-site reference materials.

Additionally, participants advocated for scenario-based training grounded in actual

field tasks such as large tree removal and traffic management operations. They also recommended accommodating various literacy levels through increased use of visual aids and potentially extending training sessions to ensure clarity and understanding.

- *Career Progression and Communication*

Feedback on career advancement revealed considerable frustration around unclear and delayed promotional processes. Respondents reported that pay increases and title changes were often postponed, despite meeting required certifications, due to administrative delays or seemingly arbitrary decisions. Employees called for a clearer, more transparent career progression process, where achieving certifications directly leads to advancement—especially at the FMT I and II levels.

Respondents also raised concerns about inconsistency in accessing training, perceived favoritism regarding equipment assignments, and poor communication with HR. They recommended establishing clear, transparent communication channels to reduce frustration and improve overall program delivery.

Overall, the qualitative responses highlight a motivated workforce encountering structural and procedural barriers. Addressing these areas—through improved scheduling, formal trainer qualifications, updated training resources, and transparent communication—could substantially enhance training effectiveness, employee morale, and career satisfaction. The insights provided by respondents are invaluable in shaping targeted improvements for the FMT training program moving forward.

#### **6.2.4 Discussions**

To examine how training satisfaction varies by employee tenure and career progression, box plots were generated for two factors: (a) employment duration and (b) FMT level. [Figure 13](#) presents these distributions, allowing a visual comparison of training satisfaction across different groups.

As shown in [Figure 13 \(a\)](#), when stratified by employment duration—*less than 1 year*, *1–2 years*, *2–5 years*, and *5+ years*—the median training satisfaction shows a slightly different pattern than job satisfaction. Although respondents with the 2–5 years category report the highest median (4.36), those in the less than 1 year group follow closely (4.27). Meanwhile, respondents with 1–2 years of service hover around 4.18, and the 5+ years category records a median of approximately 4.00.

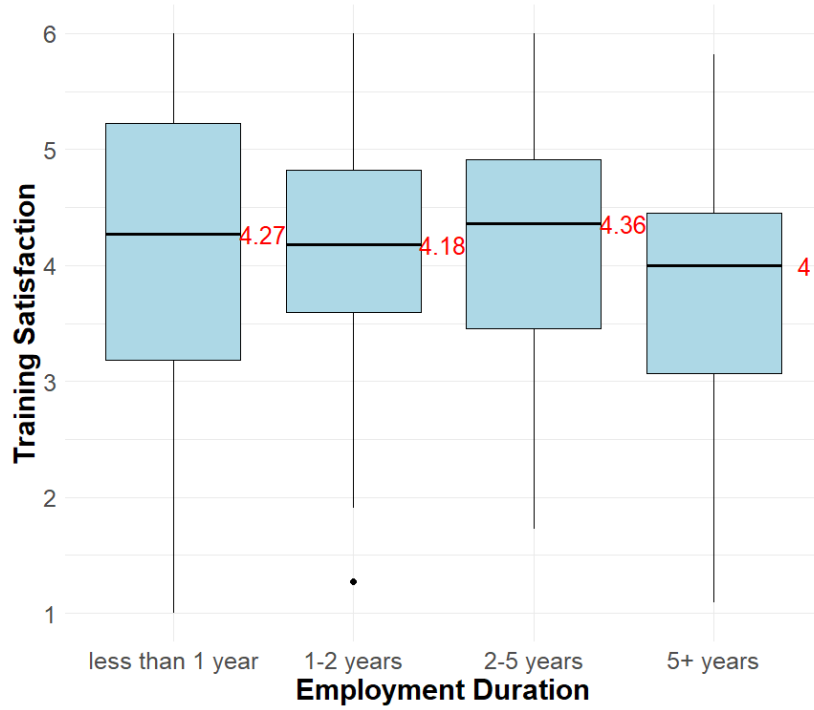
While these medians indicate only modest differences overall, they suggest that training satisfaction does not decline as consistently over time as job satisfaction appeared to.

Indeed, mid-tenure employees (2–5 years) show a surprisingly high satisfaction level, possibly reflecting that they have accrued enough familiarity with the organization to fully benefit from the training, without experiencing fatigue or stagnation. The IQRs vary across groups, pointing to individual differences in how trainees perceive program relevance or effectiveness. Outliers remain minimal, indicating that extreme dissatisfaction or strong enthusiasm are relatively rare but still present in some subgroups.

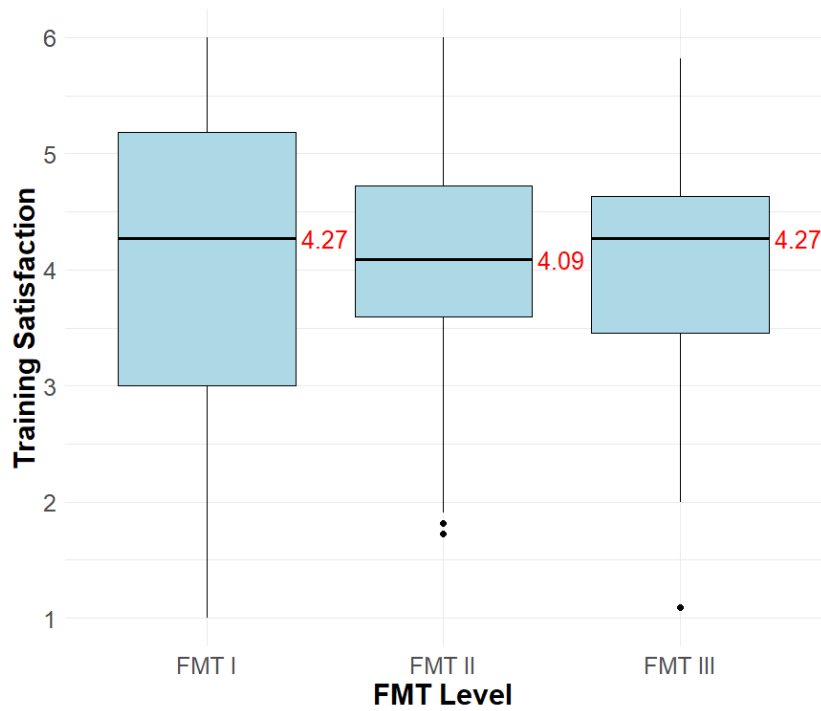
Figure 13 (b) displays training satisfaction across three career stages: FMT I, FMT II, and FMT III. Interestingly, both FMT I and FMT III share a median of roughly 4.27, while FMT II sits slightly lower at about 4.09. Although the spread of scores for each group covers close to a full point range, the differences among medians are less pronounced than those observed for job satisfaction.

Like employment duration, these results suggest that satisfaction with training opportunities remains relatively stable across FMT levels, though some variation persists. A few low-end outliers appear among FMT II, perhaps indicating individuals who feel the training does not match their immediate responsibilities or career goals.

Comparing these training satisfaction trends to the Job Satisfaction box plots reveals both parallels and distinctions. For instance, job satisfaction appeared to decline more noticeably among employees with longer tenure, whereas training satisfaction does not show the same downward trajectory. Similarly, while FMT I scored highest on job satisfaction, FMT III employees here share an equally high training satisfaction median—implying that upper-level technicians can be just as appreciative of the training resources, provided they perceive them as relevant and well-delivered.



(a) Training Satisfaction by Employment Duration



(b) Training Satisfaction by FMT Level

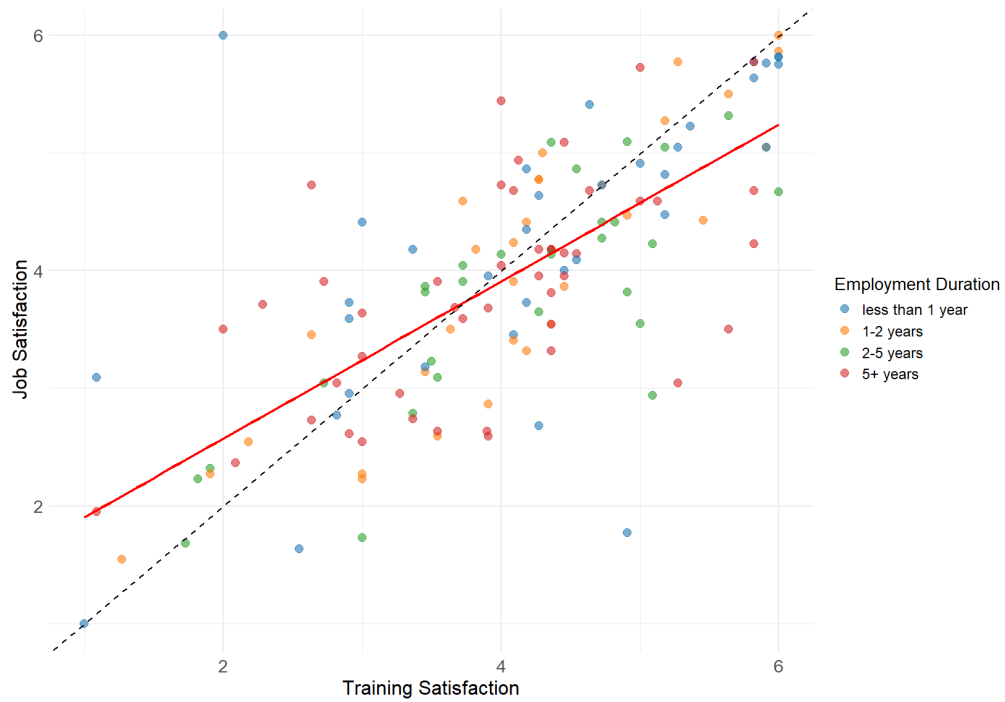
Figure 14: Boxplots of Training Satisfaction Scores

### 6.2.5 *Comparison with Job Satisfaction*

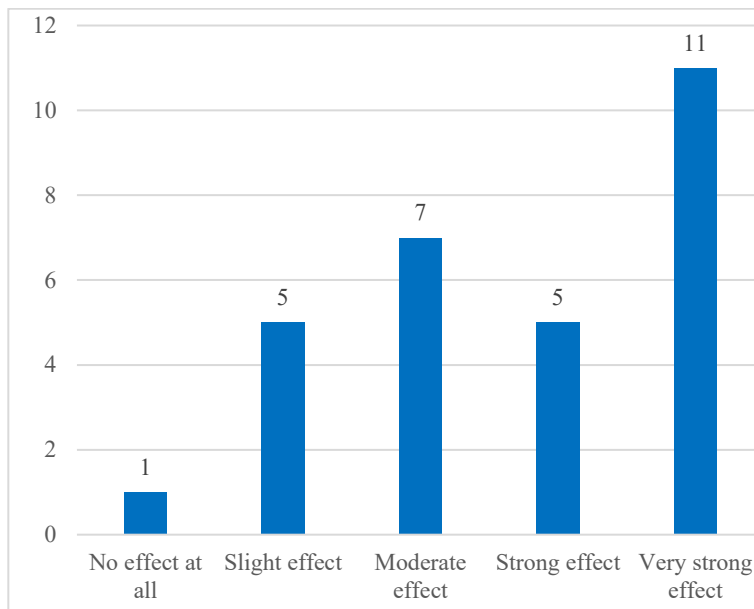
To better understand the relationship between training satisfaction and overall job satisfaction among FMTs, we plotted respondents' ratings for each category in [Figure 14 \(a\)](#). Each point in the scatterplot represents an individual's ratings, with training satisfaction on the x-axis and job satisfaction on the y-axis. A clear positive trend emerges, as indicated by the red best-fit regression line, suggesting that employees who rate their training experiences more favorably also tend to report higher job satisfaction. The dashed diagonal line represents perfect alignment between training and overall job satisfaction: points above it show employees whose job satisfaction exceeds their training satisfaction, while those below indicate the reverse. Although most data points cluster near this diagonal, indicating general alignment, there is noteworthy variability that suggests factors besides training also shape how employees perceive their jobs.

Since correlation does not establish causality, we sought to gauge employees' own views on whether improving training programs might boost overall job satisfaction. During a recent meeting with FMTs, they were asked: "Our data shows a strong correlation between training satisfaction and overall job satisfaction among employees. In your view, to what extent does improving training programs influence broader job satisfaction?"

Their feedback is depicted in [Figure 14\(b\)](#). Only one respondent believed that better training would have "No effect at all," while five saw "Slight" impact, seven considered it "Moderate," five described it as "Strong," and the largest group, eleven participants, rated it a "Very strong effect." This indicates that a majority of the workforce perceives significant benefits to overall job satisfaction from enhancing training programs. Meanwhile, a smaller but notable segment anticipates only modest or no effects, suggesting that other elements such as compensation, promotion opportunities, and the broader work environment may play major roles. Nonetheless, these results reinforce that, from the FMTs' perspective, improved training could meaningfully bolster overall job satisfaction.



(a) Illustration of FMTs' Job Satisfaction and Training Satisfaction



(b) FMT Perceptions of How Improved Training Affects Overall Job Satisfaction

**Figure 15: Job Satisfaction versus Training Satisfaction**

## 6.3 Perception from the Trainee Perspective - Organizational Development Division Training Program Feedback

### 6.3.1 Training Program Participation

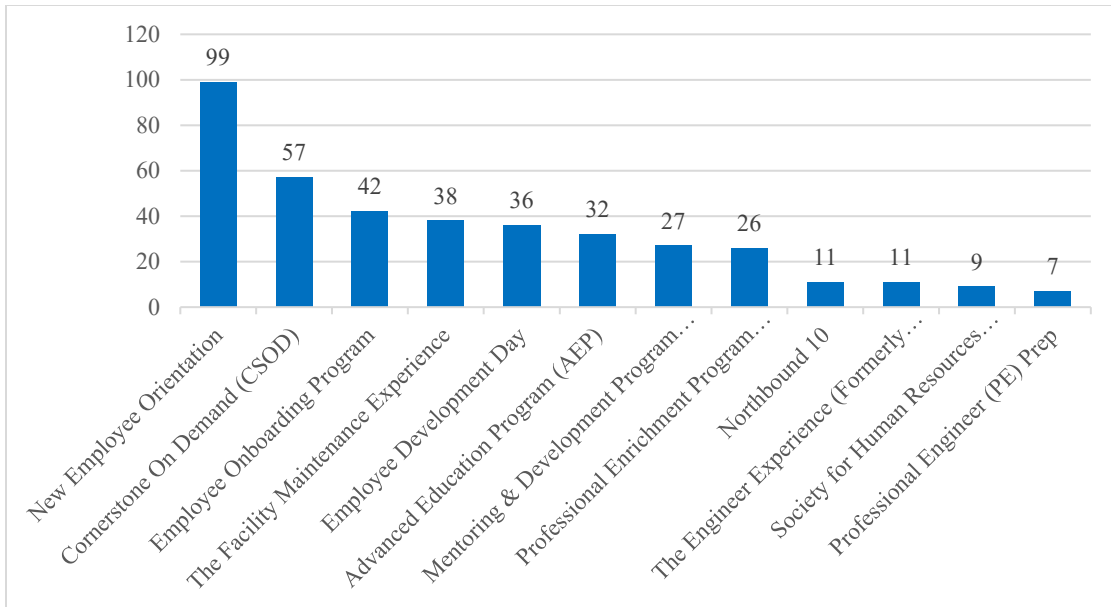
To assess engagement with OD training opportunities, FMT respondents were asked about their familiarity with and participation in a range of available programs. [Figure 16](#) presents the results across three dimensions: awareness of programs, participation levels, and reasons for non-participation.

As shown in [Figure 16 \(a\)](#), the most widely recognized training was the New Employee Orientation, with 99 respondents indicating they had heard of it. This was followed by Cornerstone on Demand (GSOD) (57 mentions), Employee Onboarding Program (42), and The Facility Maintenance Experience (38). Awareness steadily declined across more specialized or less frequently offered programs, such as the Professional Engineer (PE) Prep and The Engineer Experience, each known to only a few respondents.

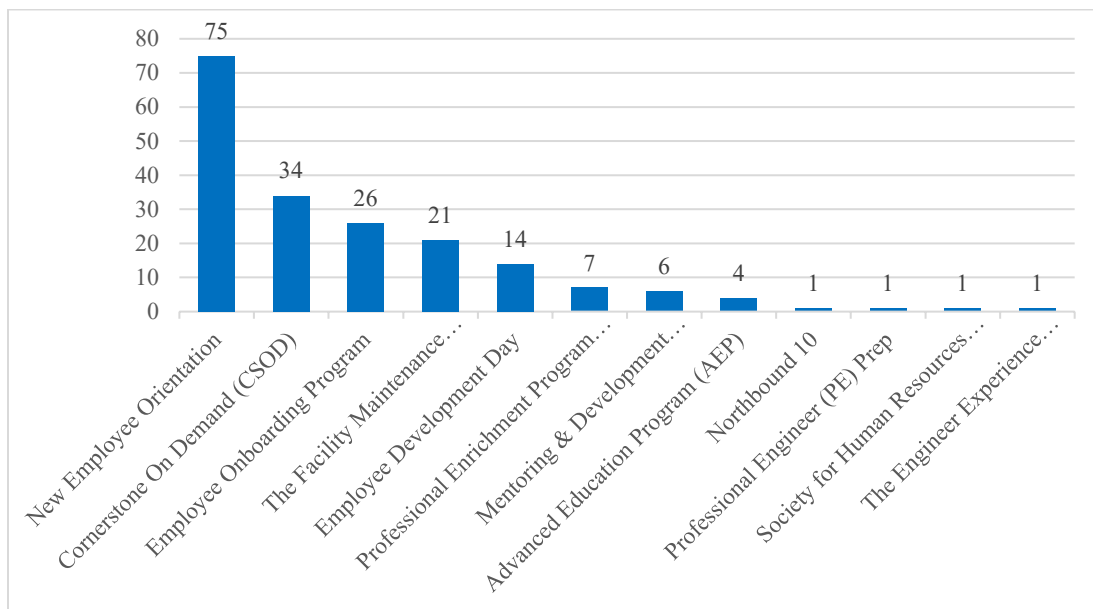
In terms of actual participation, shown in [Figure 16 \(b\)](#), New Employee Orientation again led the responses, with 75 participants. However, participation rates dropped off significantly across the other programs. For example, while GSOD was known by 57 respondents, only 34 reported taking part in it. Similarly, although 36 respondents had heard of the Employee Development Day, only 14 reported participations. Across most training types, a notable gap exists between awareness and actual engagement, suggesting barriers to access.

[Figure 16 \(c\)](#) explores these barriers by asking respondents why they did not participate in certain programs. The most common reason, cited by 54 respondents, was simply not having had the chance to participate. Another 39 indicated that they plan to participate at a later time, showing potential demand that could be met with more accessible or frequent offerings. Other responses included perceived lack of relevance to current work (15), lack of interest (14), and failure to meet eligibility requirements (12). A small number selected “Other” and offered miscellaneous explanations (8 responses).

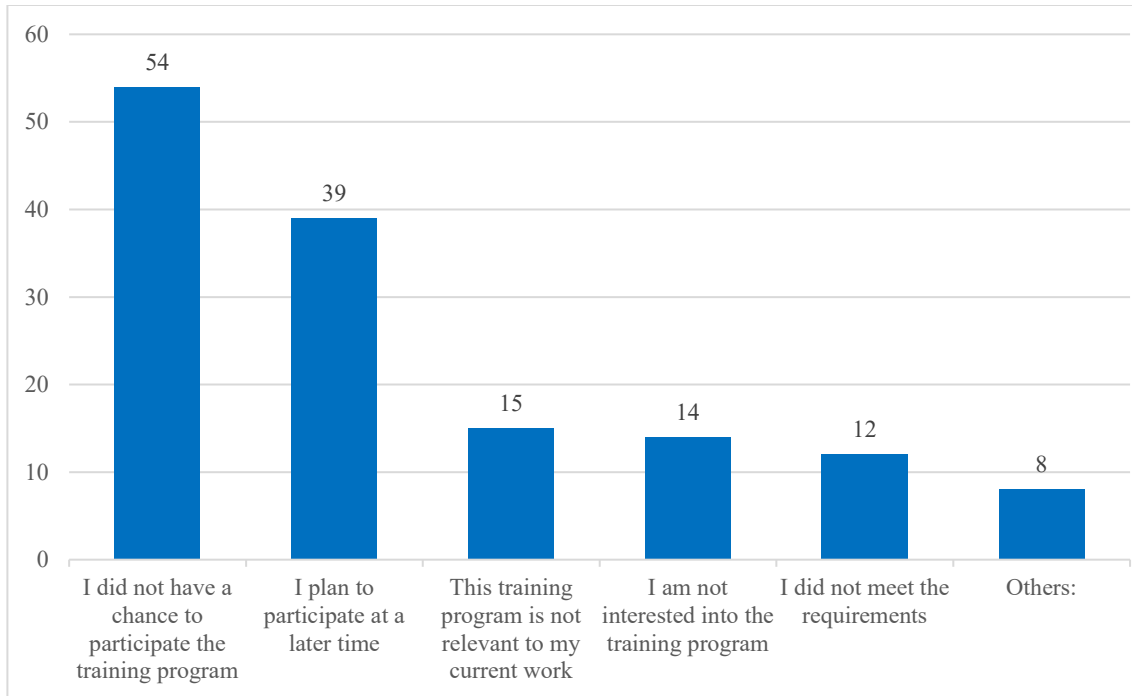
Together, these findings highlight the importance of improving access to and visibility of OD training opportunities. While awareness is relatively high for key programs, actual participation remains limited, often due to logistical constraints or timing. Addressing these gaps, through more flexible scheduling, better communication, and targeted outreach, could help increase engagement with professional development resources offered by MDOT SHA.



(a) Choose the training programs you have heard about



(b) Choose the training programs you have finished or are currently participating in



(c) what are the reasons that you did not participate in certain training programs?

**Figure 16:** Training Program Participation

Table 14 presents trainee satisfaction with the OD training program, as measured through a set of Likert-scale questions. The patterns observed here closely mirror those reported in Table 13, which assessed satisfaction with the OOM training program. In both cases, respondents expressed generally positive views regarding trainer communication, hands-on engagement, and post-training support, while showing more mixed opinions on the flexibility of training offerings. Given the similarity in trends and the interest in conserving space, detailed interpretation is omitted here.

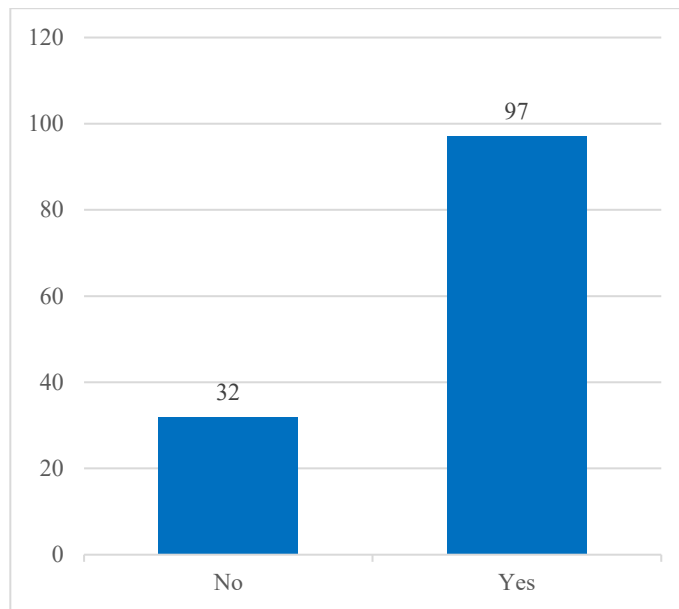
**Table 14:** Results for Trainee Satisfaction about the Training Program from Organizational Development Division

Topic	Statement	Median	Mode	Mean	Var
Training Experience	The training opportunities provided are sufficient for my needs to perform the job well and safely	4	5	4.08	1.85
	I can choose from different training types that fit what I like and can do	4	4	3.54	2.29
	The training program supports my advancement opportunities	4	4	3.90	1.97
	The training materials are complete and clear	4	5	4.04	1.88
	The training sessions are well-organized and structured	4	4	3.84	2.24
	I am happy with the amount of hands-on practice during training	4	4	3.93	2.21
	The trainers know a lot and are easy to talk to	4	4	4.18	2.27

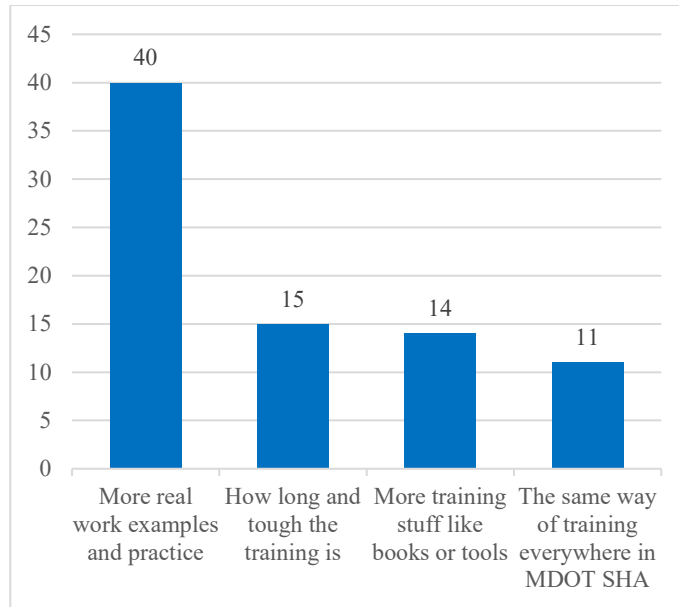
The trainers talk clearly and involve us during the training	5	6	4.41	2.03
I am able to give feedback and ask questions during training	5	5	4.54	1.61
When I apply what I learned from training, I get enough support	4	4	4.35	1.79
I'm happy with the follow-up I get after training	4	4	4.02	2.38

### 6.3.2 Potential improvements identified by FMTs

As illustrated in [Figure 17](#), most FMT respondents (97 out of 129, or 75%) indicated that OD training programs need improvement or revision. When specifying areas for improvement, their responses echoed many themes from feedback about the OOM training program. This similarity suggests that respondents may have interpreted the question as primarily relating to technical or operational training, likely due to its relevance to their daily tasks. Additionally, some respondents may not have clearly differentiated between OD and OOM training when answering, especially if similar wording appeared across different sections of the survey.



(a) I think the training program should be improved or changed.



(b) what parts of the training programs could be improved to better support your job performance?

**Figure 17:** FMT perceptions on the need for training program changes

### 6.3.3 Open-ended Question: Improvement for the Training Program

When reviewing open-ended responses regarding the OD training programs, many answers appeared to refer primarily to the OOM training offerings. Participants frequently mentioned topics such as hands-on instruction, equipment certifications, training logistics, and field-based learning—areas closely aligned with OOM’s core curriculum. This may also suggest FMTs may have interpreted these questions as referring operational or technical training.

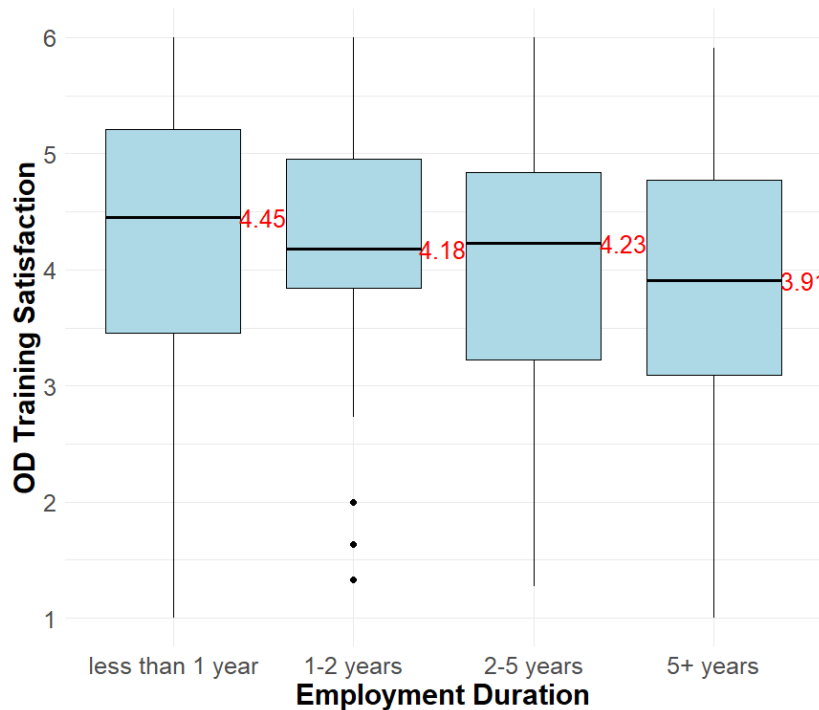
Among comments specifically addressing OD’s training programs, several respondents pointed out cultural and interpersonal issues. Instances of negativity toward new hires were described, along with requests for a more respectful, supportive environment. Many noted challenges with reading-oriented materials and asked for clearer guidance or one-on-one help rather than heavy reliance on written handbooks. Others called for more frequent seminars, classes or mentoring check-ins to sustain momentum and reinforce learning. Taken together, these comments highlight OD opportunities: strengthen onboarding and mentoring programs and ensure materials are accessible to varying learning styles and foster a respectful culture.

### 6.3.4 Discussions

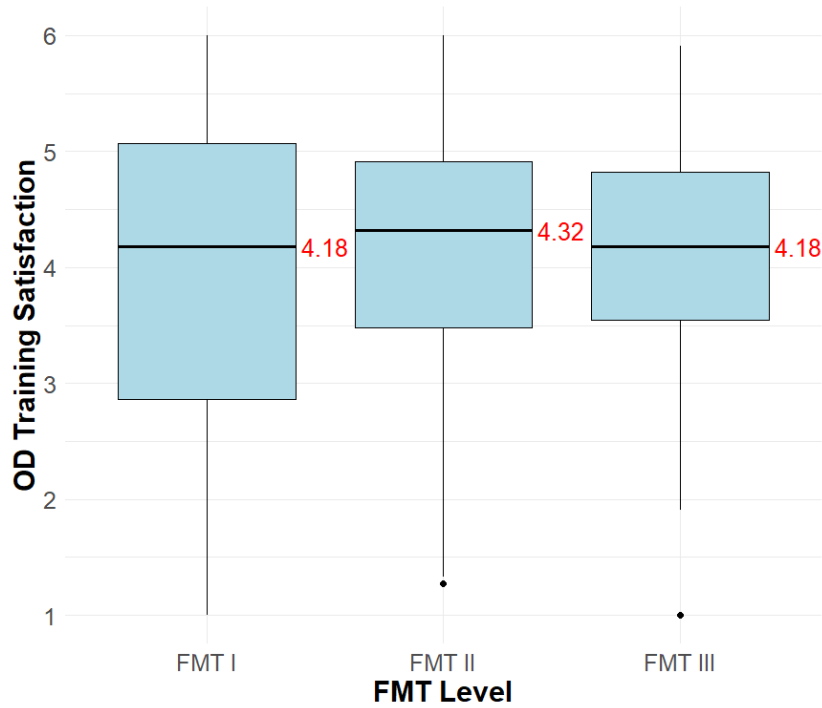
Figure 18 shows how satisfaction with OD training varies based on (a) employment

duration and (b) FMT level. When comparing OD training satisfaction across four tenure groups (less than 1 year, 1–2 years, 2–5 years, and 5+ years), employees with under one year of service report the highest median (4.45). Those with 2–5 years follow closely at 4.23, while 1–2 years score around 4.18. In contrast, the 5+ years group shows a somewhat lower median (3.91). Although these differences are not dramatic, they suggest that newer employees often perceive OD training more favorably, possibly due to the most FMTs have only attended courses aimed at new hires, such as the New Employee Orientation and the Employee Onboarding Program. A small set of outliers, especially among 1–2 year employees, indicates individual variations in how participants value OD offerings.

Across FMT ranks (I, II, and III), median OD training satisfaction hovers within a narrow range of 4.18–4.32. FMT II reports the highest median (4.32), while FMT I and III both sit at 4.18. The box plots show few low-end outliers, suggesting that, overall, technicians at any level view OD training consistently, with no steep drop or surge at higher ranks. Compared to earlier findings for the OOM programs, OD training satisfaction is slightly more uniform across both tenure and FMT levels. While newer employees again tend to rate their experiences more positively, the differences are modest.



(a) Organizational Development Training Satisfaction by Employment Duration



(b) Organizational Development Training Satisfaction by FMT Level

**Figure 18:** Boxplots of Organizational Development Training Satisfaction

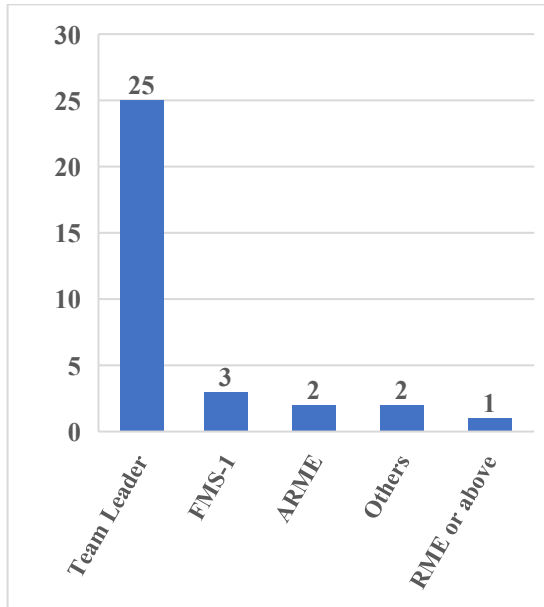
## 6.4 Perception from the Trainer Perspective

### 6.4.1 Respondents Background Overview

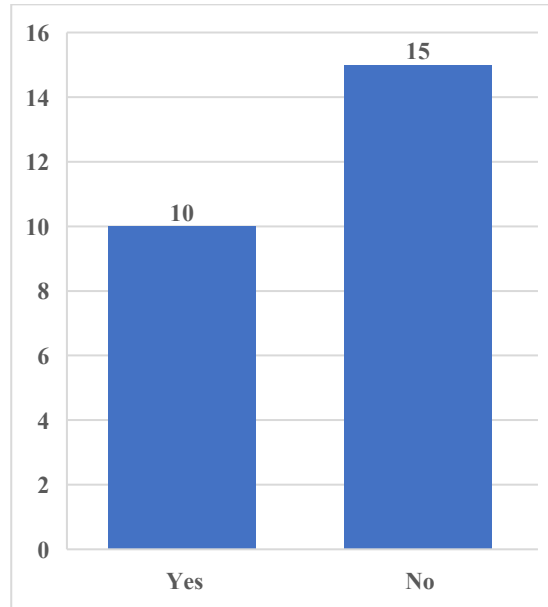
This section provides background information on the individuals who participated in the trainer survey. [Figure 19](#) illustrates the current roles, material preparation habits, and training topics delivered by these respondents.

As shown in [Figure 19 \(a\)](#), the majority of trainer respondents currently serve as Team Leaders (25 respondents). Smaller numbers hold roles such as FMS-1 (3), ARME (2), RME or above (1), or other unspecified positions (2). This indicates that frontline supervisors play the most active role in training delivery within the FMT series. Regarding material preparation, [Figure 19 \(b\)](#) shows that 15 trainers reported they do not prepare training materials themselves, while 10 indicated they do. This finding suggests that a significant portion of training relies on pre-developed or centrally provided content, which may affect consistency and relevance across districts. [Figure 19 \(c\)](#) presents the types of training programs delivered by respondents. Equipment Certification training was by far the most commonly taught (16 trainers), followed by Temporary Traffic Control and Traffic Manager Training (8), FMCSA Training (5), and ATSSA Flagger Certification Training (2). An additional 12 respondents selected "Other," likely indicating specialized or less

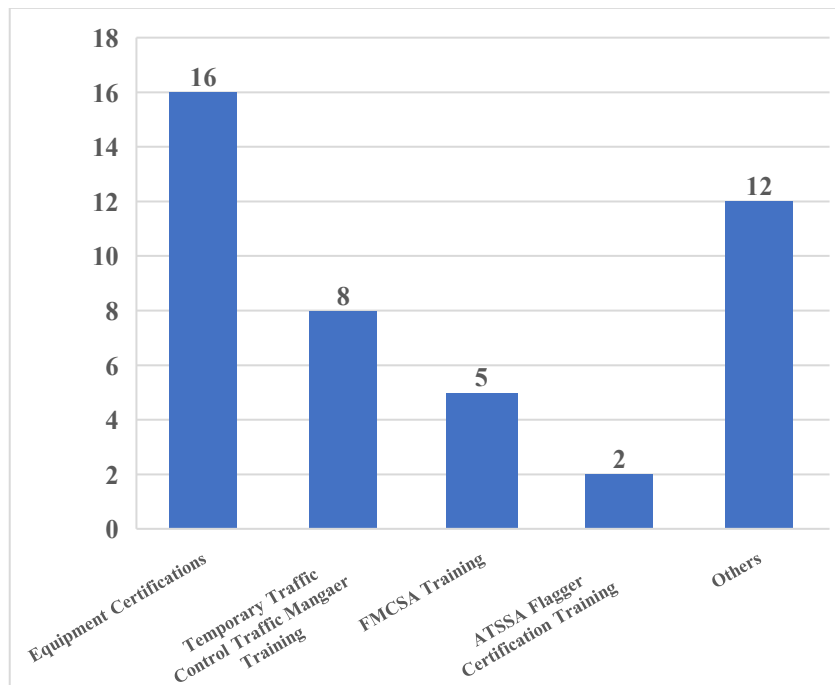
common training programs.



(a) Current Role



(b) Do you prepare the materials by yourself?



(c) Training Program Taught

**Figure 19:** Trainer background overview

## 6.4.2 *Satisfaction and Effectiveness of Training Programs*

This section summarizes trainer perceptions regarding the quality and impact of the training programs they deliver. As shown in [Figure 20](#), feedback was collected across four dimensions: satisfaction with materials, practical relevance, perceived training effectiveness, and clarity of career progression.

- *Training Materials*

When asked about satisfaction with the materials provided ([Figure 20 \(a\)](#)), the majority of trainers expressed positive views. Specifically, 14 respondents selected "Satisfied" and 5 selected "Very Satisfied." A smaller group reported dissatisfaction, with 2 "Very Unsatisfied" and 5 "Unsatisfied" responses. This distribution suggests that while most trainers are content with the quality of training materials, there is room for improvement in consistency and usability.

- *Practical Relevance*

Trainers were also asked how well the training addresses the hands-on aspects of the job ([Figure 20 \(b\)](#)). The most common response was "Moderately Effective" (12 respondents), followed by "Very Effective" (8) and "Slightly Effective" (8). Only 1 respondent considered it "Extremely Effective", while 6 reported it as "Not Effective at All." These results indicate a generally moderate perception of practical relevance, suggesting that programs may benefit from a stronger emphasis on real-world application.

- *Perceived Training Effectiveness*

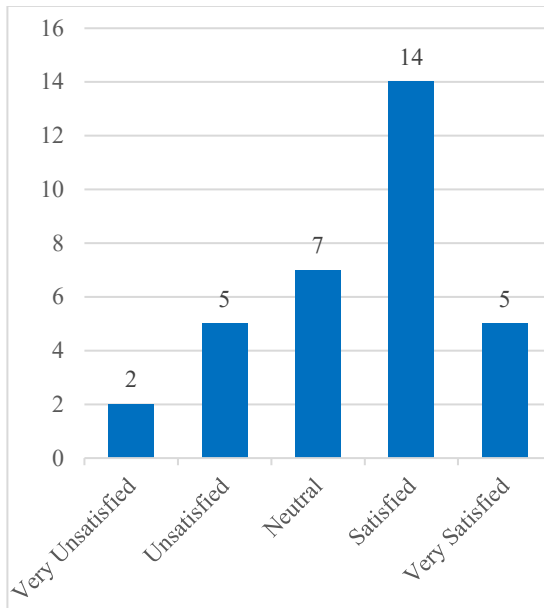
As shown in [Figure 20 \(c\)](#), trainers' views on how well the programs prepare trainees were mixed. The most frequent response was "Somewhat Prepared" (15 respondents), followed by "Slightly Prepared" (9) and "Very Prepared" (5). Only 2 respondents felt trainees were "Fully Prepared," while 4 believed they were "Not at All Prepared." This trend highlights the need for strategies to enhance training effectiveness.

- *Career Progression Clarity*

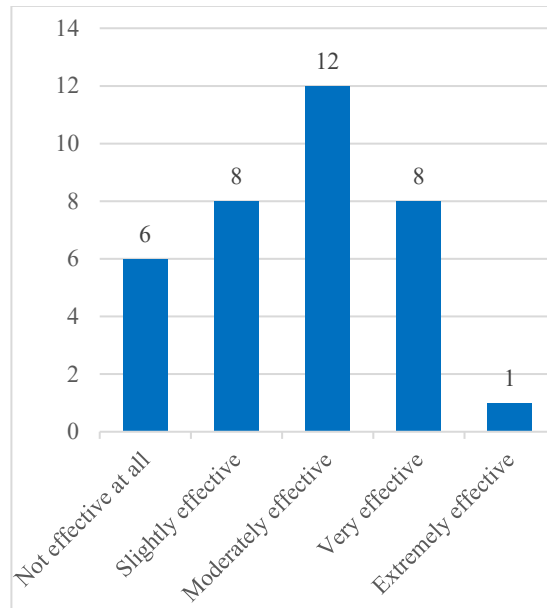
Finally, when asked if the training programs provide a clear pathway for trainee advancement ([Figure 20 \(d\)](#)), responses varied. A majority leaned positive, with 12 respondents selecting "Agree" and 5 selecting "Strongly Agree." However, 10 chose "Neutral", and a combined 8 respondents disagreed to some extent. These findings suggest that while many trainers see a connection between training and advancement, communication around progression opportunities may still be unclear or inconsistent.

In summary, trainers largely value the content they deliver but see opportunities for

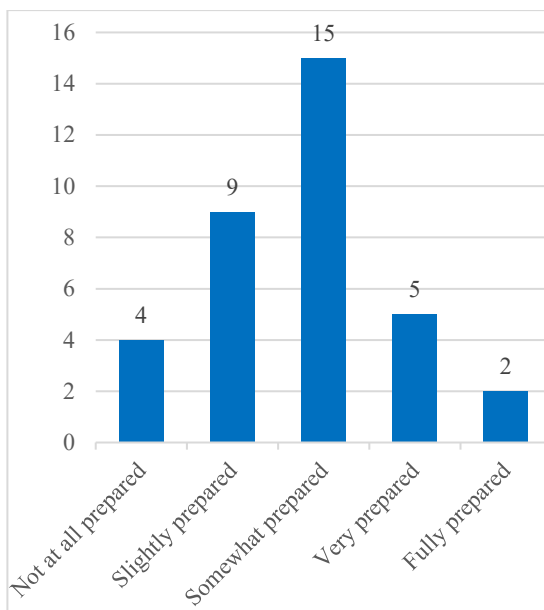
improvement in ensuring trainees are adequately prepared for their jobs and that programs are clearly linked to career growth.



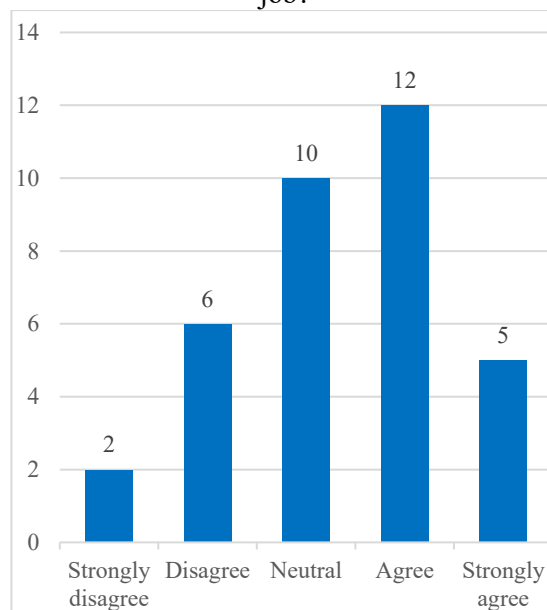
(a) How satisfied are you with the training materials provided?



(b) How effectively do you think the training programs address the practical aspects of the job?



(c) To what extent do you feel the training programs prepare trainees for their roles?



(d) Do you believe there is a clear progression path for trainees following the training programs?

**Figure 20:** Satisfaction and Effectiveness of Training Program

### 6.4.3 *A list of Open-ended Questions*

- *What components of the training program do you find most valuable, and why?*

The feedback provided by trainers highlights a shared understanding of the most effective and valuable elements within MDOT SHA's training program. Chief among these is hands-on training, which trainers consistently identify as the most engaging and impactful method for skill development. According to their responses, trainees demonstrate greater focus, retention, and confidence when working directly with equipment, compared to learning in a traditional classroom setting. Several trainers noted that real-world application, such as operating forklifts, conducting yard walk-arounds, or completing shop-based driving exercises, plays a critical role in building job-ready competencies.

Trainers also emphasized the importance of equipment-specific instruction and mentor-mentee relationships. These relationships facilitate not only technical learning but also personalized support that helps trainees build confidence and progress toward career goals. Some responses highlighted that mentorship allows trainees to better understand the expectations of higher-level positions and gain insight from experienced staff. In addition, programs like the MLA were mentioned as particularly valuable for helping employees understand agency-wide responsibilities and prepare for supervisory roles. Overall, the trainer feedback reflects a strong endorsement of applied learning, one-on-one support, and structured development as core strengths of the current training program.

- *Can you describe a particular training session that you found very effective? What made it stand out?*

Many highlighted equipment-focused sessions, particularly those involving the loader, mini excavator, dump truck, and mini HOG. These trainings were seen as directly aligned with core field duties and essential for building operator confidence and technical proficiency. The mini HOG was specifically noted for its practical structure and clear evaluation criteria. Seasonal programs like Snow College were also praised, especially when they included hands-on tasks such as ramp and table building and featured active participation, clear facilitation, and district-level coordination. The Train-the-Trainer session was frequently mentioned for helping new instructors develop foundational skills in both equipment use and instructional delivery. Interestingly, several trainers cited the MLA as an especially impactful experience. This response pattern suggests that some trainers may have interpreted the question as referring to their own professional development rather than the sessions they delivered. Still, their reflections on MLA underscore its value in leadership growth, cross-district networking, and sustained application of learning through practical tools and materials.

- *In your opinion, what are the strengths and weaknesses of the training program?*

The feedback reveals a nuanced understanding among trainers regarding both the benefits and shortcomings of the current MDOT SHA training program. Many respondents identified field tests and practical learning opportunities as core strengths. These were seen as particularly useful for providing realistic exposure to equipment and tasks trainees will encounter in the field. Several trainers also highlighted the variety of training topics and the opportunity to interact with peers from other districts, which can broaden perspectives and promote professional networking. However, the weaknesses identified were more numerous and consistent in theme. The most frequently cited concern was the use of outdated training materials, including books and written exams that no longer reflect the equipment or procedures currently in use. This disconnect between training content and real-world conditions undermines instructional effectiveness and frustrates both trainers and trainees. Respondents also emphasized a lack of sufficient hands-on training, with some noting that too much time is spent on theory or computer-based modules rather than direct equipment experience.

Another common criticism was inconsistency in trainer commitment and engagement across locations. Some trainers expressed concern that their peers in other shops were not providing adequate instruction or were rushing trainees through the program for pay-related reasons rather than focusing on skill development. Additionally, respondents pointed to logistical and scheduling challenges, such as limited class availability, long delays between sessions, and the burden of traveling to distant training sites. The slow certification and approval process was also raised as a barrier to advancement, especially when employees already possess relevant experience.

Finally, some feedback focused on systemic constraints, such as limited opportunities for leadership-level training, inflexible promotion timelines, and a lack of specialized content for job-specific roles. These issues were seen as demotivating and counterproductive, especially in the context of workforce retention and progression.

- *How could the training programs be improved to better serve the needs of the trainees?*

The responses to this question reflect a clear desire among trainers for improvements in both the content and delivery of the MDOT SHA training programs. A common recommendation was to update written materials and testing content to accurately reflect the equipment currently used in the field. Multiple trainers pointed out that existing manuals and exams are outdated or irrelevant to the realities of modern job functions, particularly for equipment such as dump trucks, tractor mowers, and other heavy machinery.

Another central theme was the need for training to take place in realistic environments. Several trainers criticized the reliance on asphalt parking lots for equipment demonstrations, emphasizing that real-world field conditions are critical for effective learning. Respondents also advocated for longer, more in-depth training sessions that allow for extended hands-on practice, especially for newer employees or those seeking advancement to higher skill levels.

There were also logistical and structural concerns. Trainers suggested that training be held closer to employees' home shops, both to reduce travel burdens and to create consistency in learning environments. Additionally, there were calls for more flexibility in delivery methods, including in-house training and boot camp-style programs tailored for entry-level staff. These would allow for quicker skill development and earlier certification, aligning with operational demands.

Several trainers emphasized the importance of equipment-specific instruction and competency-based testing, noting that assessments should reflect the actual equipment an individual has trained on and the duration of their experience. The idea of incorporating scenario-based testing was also raised, with examples such as simulating roadside mowing or snow removal to ensure readiness under realistic conditions.

Lastly, responses highlighted the need for more experienced, qualified trainers, particularly those who are familiar with field operations. Some suggested that mentorship and instruction should be led by staff with proven, hands-on expertise to ensure training is relevant, credible, and respected.

- *Have you received any feedback from trainees that you think should be acted upon?*

While most trainers responded with "No" or "N/A" to this question. A few trainers noted that trainees have voiced concerns worth addressing. The most frequently mentioned issue was the need to update training manuals and tests to reflect current equipment and procedures. Additionally, one trainer highlighted feedback regarding the slow pace of advancement, suggesting that the promotion process should be more responsive to individual readiness. Although limited in number, these responses align with broader themes of curriculum relevance and career progression that appear throughout the evaluation.

- *What additional topics or skills do you believe should be included in future training programs?*

Trainers identified several key areas for expansion in future training programs, many of which align with operational needs and observed skill gaps. A major recommendation was the inclusion of more advanced equipment training, such as certification for Hydradig,

Boomaxe, and skid steer milling, as well as enhanced instruction for hill-side and traffic-area mowing. Several respondents also called for refresher courses and on-the-job training programs, especially for returning or transitioning employees.

Leadership development was another notable theme. Trainers suggested more structured training for positions like FMS-1, ARME, and RME, given high turnover rates and the resulting loss of institutional knowledge. Additionally, computer skills and communication-focused modules (such as becoming a better listener or dealing with customers) were recommended, particularly for team leaders.

- *Is there anything you would change about the structure or delivery of the training programs?*

Trainers provided several practical suggestions for improving the structure and delivery of the training programs. A key theme was the desire for training to be held closer to home shops, ideally with individuals who work together or may do so in the future. This adjustment was seen as a way to improve efficiency, reduce travel-related disruptions, and foster more relevant team-based learning. Another commonly mentioned recommendation was to increase hands-on and on-the-job training opportunities, with some suggesting that FMTs receive their initial training and certifications before entering the shop. Others proposed implementing refresher training throughout the year to maintain skill levels and support continuous development.

Trainers also pointed to the need for stronger communication and coordination between shop trainers and training coordinators, along with better evaluation of trainer performance. One response emphasized having certified instructors embedded in each shop, eliminating reliance on centralized certification from the OOM. A few respondents suggested revisiting hiring practices, proposing that experienced operators from outside the agency be directly hired into advanced roles to reduce internal training loads.

## **6.5 Summary**

This chapter provided a comprehensive evaluation of MDOT SHA's current training programs for FMTs, drawing from the perspectives of both trainees and trainers. The findings highlight key strengths in the agency's efforts to build workforce capabilities, while also pointing to areas where strategic improvements could significantly enhance training impact, equity, and efficiency.

From the trainee perspective, feedback on the OOM training programs revealed generally positive views on hands-on practice, trainer knowledge, and the ability to engage during sessions. However, respondents also expressed concern about the limited variety of

training options, outdated materials, inconsistent scheduling, and unclear career advancement pathways. Many noted that while training helps them perform safely and effectively, they often face delays in certification and promotion despite meeting program requirements. Similar patterns emerged in the feedback on the OD training programs. FMTs appreciated the content when accessed but reported challenges related to training accessibility and limited frequency.

Quantitative analysis showed a positive correlation between training satisfaction and overall job satisfaction, reinforcing the importance of investing in training quality and delivery. Employees who view their training experiences favorably are more likely to report greater satisfaction with their jobs overall.

The trainer perspective largely echoed these concerns. While most trainers expressed satisfaction with the content they deliver and the value of field-based instruction, they also highlighted inconsistencies in training material quality, gaps in hands-on practice, and systemic scheduling and logistical issues. Many emphasized the need for updated and relevant content, more flexible training structures, and clearer alignment between training outcomes and advancement opportunities. Trainers also expressed interest in additional instructional support, including better coordination, localized delivery models, and enhanced trainer preparation.

In summary, the chapter illustrates a workforce that values training but feels limited by outdated materials, logistical barriers, and a lack of transparency. Improving the flexibility, relevance, and responsiveness of training programs, while strengthening the link between training, advancement, and job readiness, will be key to fostering engagement, retention, and long-term success of FMTs.

## Chapter 7. Conclusion and Recommendation

### 7.1 Conclusion of the Findings

This research project aims at evaluating the current training program of FMTs at MDOT SHA to inform future revisions to the training program and support MDOT SHA's broader goal of cultivating a resilient, skilled, and well-supported FMT workforce. Throughout this project, the research team reviewed national practices of training program for non-supervisory-level maintenance employees, reviewed current FMT training project at MDOT SHA and compared with the national practices, as well as conducted surveys to evaluate job satisfactions of FMTs and current training project from both the trainee/FMT perspective and the trainers' perspective.

The national review found that DOT training programs for non-supervisory maintenance staff, from new hires through those preparing for promotion, vary widely in structure and scope. Some agencies offer broad, general courses, while others provide tiered or specialized curricula aligned with specific career levels. Consequently, program durations range from multi-day workshops to multi-year academies, and session frequency differs by state. Most training materials are developed in-house, although several agencies supplement with pre-recorded online modules. Core topics include safety protocols, CDL certification, equipment operation and maintenance, snow and weather operations, career development, and mental health. Many states also offer targeted modules, such as traffic control, infrastructure inspection, pavement maintenance, basic mathematics, and effective communication, to address localized workforce needs.

The current MDOT SHA FMT training program offers a progressive certification pathway, beginning with CDL and ATSSA flagger training and advancing through increasingly specialized equipment and environmental certificates. It incorporates a formal application process, supervised instruction, and rigorous field and written examinations. Complementing this, the Maintenance Leadership Academy equips supervisors with knowledge of SHA's financial and operational systems, decision-making frameworks, and data-driven management practices, while the Organizational Development division delivers new-hire orientation, leadership development, and continuing education to support professional growth and organizational goals. Compared to other states, MDOT SHA program's strengths include its clear certification ladder, "safety first" entry requirements, hybrid learning model, region-validated content, national recognition, comprehensive leadership pipeline, and data-driven learning management. Opportunities for improvement have also been identified and will be detailed in the next section.

The job satisfaction survey of FMTs revealed high satisfaction with leave flexibility, health insurance, and recognition from direct supervisors, but lower satisfaction regarding salary, promotion speed, and internal communication. These trends remained consistent across all FMT levels. Open-ended survey responses highlighted the need for more frequent hands-on training, mentorship, and clearly defined advancement pathways. Respondents also expressed concerns about delays in certification processes and inconsistent access to professional development resources. Additionally, survey analysis showed a gradual decline in job satisfaction as tenure and rank increased, suggesting reduced engagement over time. These findings align closely with insights from MDOT SHA's internal job exit survey.

The evaluation of MDOT SHA's current training programs for FMTs draws from the perspectives of both trainees and trainers. From the trainee perspective, feedback on the OOM training programs revealed generally positive views on hands-on practice, trainer knowledge, and the ability to engage during sessions. However, respondents also expressed concern about the limited variety of training options, outdated materials, inconsistent scheduling, and unclear career advancement pathways. Many noted that they often face delays in certification and promotion despite meeting program requirements. Similarly, for the OD training programs, FMTs appreciated the content when accessed but reported challenges related to training accessibility and limited frequency. The trainer perspective largely echoed these concerns. While most trainers expressed satisfaction with the content they deliver and the value of field-based instruction, they also highlighted inconsistencies in training material quality, gaps in hands-on practice, and systemic scheduling and logistical issues. Trainers also expressed interest in additional instructional support, including better coordination, localized delivery models, and enhanced trainer preparation. A positive correlation between training satisfaction and overall job satisfaction is found, reinforcing the importance of investing in training quality and delivery.

In summary, MDOT SHA has established a strong foundation for its FMT training programs, but targeted improvements are necessary to enhance workforce retention, boost efficiency, and ensure training closely aligns with real-world job demands. The following sections provide recommendations informed by these findings to strengthen FMT workforce development and organizational performance.

## **7.2 Recommendations**

Based on the findings, this section outlines targeted recommendations to strengthen the effectiveness, relevance, and accessibility of MDOT SHA's training program for FMTs. By addressing systemic challenges and supporting employee growth, MDOT SHA can enhance both job satisfaction and operational outcomes.

### *Modernize Training Materials and Processes*

- Update instructional content: Revise written materials, exam questions, and digital resources to align with current equipment and procedures. Consider adopting scenario-based modules that reflect real-world challenges, such as large tree removal and complex traffic management.
- Streamline certification timelines: Minimize delays between training and certification exams so that newly acquired skills are reinforced quickly. Provide multiple testing opportunities based on individual readiness.
- Leverage blended learning: Incorporate a mix of online modules, hands-on workshops, and field-based simulations, ensuring that training remains flexible and accommodates different learning styles.
- Expand microlearning options: Develop short ( $\leq 60$ -minute) safety or equipment videos accessible via mobile devices to provide on-demand refreshers and support just-in-time learning in the field.

### *Expand Hands-On and Field-Based Training*

- Boost practical experience: Shift emphasis from classroom theory to hands-on tasks that mirror daily operations, such as heavy-equipment handling, seasonal operations (snow or vegetation control), and emergency responses.
- Localize delivery: Wherever possible, move training sessions closer to employees' home shops or within their districts. This approach minimizes travel time and offers practical learning in a setting that reflects participants' actual work environment.
- Enhance mentorship: Establish a formal mentorship structure in which experienced technicians provide ongoing coaching for newer employees. This peer-oriented approach can accelerate skill adoption and foster a more supportive culture.
- Respect diverse learning needs: Offer specialized resources or extended time for trainees who benefit from alternative teaching methods, including visual aids and additional practice sessions.

### *Enhance Communication and Information Delivery*

- Integrate multiple communication channels: Recognize that training and career advancement should operate as a continuous loop, supported by effective communication. While much useful information is already published via email, FMTs may not always read these messages. Additional channels such as mobile alerts, in-person briefings, interactive bulletin boards, and QR codes could be adopted to ensure that

critical updates about training opportunities, certification changes, and promotion pathways are noticed by all employees.

- **Facilitate two-way communication:** Establish systems that allow for timely feedback and queries, ensuring that both trainees and trainers can collaborate to refine and improve the training process.
- **Report training outcomes publicly:** Create dashboards to track and share key metrics such as training completion, promotion rates, or readiness indicators,

#### *Improve Scheduling and Accessibility*

- **Offer year-round sessions:** Provide regular training cycles, including refresher courses, to prevent prolonged gaps between sessions. This ensures employees can maintain and build upon newly acquired knowledge.
- **Coordinate with seasonal workloads:** Align training with off-peak times or slower seasons, optimizing resource availability and reducing operational disruptions.
- **Strengthen communication:** Use centralized scheduling tools or online portals to inform employees of upcoming courses, track progress, and manage enrollment in a transparent manner.

#### *Clarify Career Advancement and Promotional Pathways*

- **Clarify certifications and promotions:** Clearly communicate the skill and certification requirements for each FMT level, ensuring employees understand how completing certain courses leads to career progression.
- **Accelerate reclassification:** Reduce administrative delays for position reclassification once employees meet all requisite training and certification benchmarks.
- **Offer leadership development:** Enhance programs like the Maintenance Leadership Academy (MLA) and consider adding mid-level supervisory modules, equipping employees with skills for team leadership and broader operational decision-making.
- **Integrate external certifications:** Adopt credentialing systems by incorporating certifications such as NCCER, OSHA-10, or FEMA ICS into the FMT advancement framework.

#### *Strengthen Trainer Preparation and Oversight*

- **Formalize trainer qualifications:** Require standardized “Train-the-Trainer” courses to ensure consistent instruction quality and alignment with current procedures.

- Evaluate trainer performance: Implement feedback loops where trainees evaluate instructor clarity, organization, and engagement, enabling MDOT SHA to identify areas needing improvement.
- Recognize exemplary trainers: Provide incentives, such as recognition awards or professional development opportunities, to motivate trainers to maintain high-quality instruction.

By implementing these recommendations, MDOT SHA can better align its FMT training programs with operational needs, employee career goals, and broader organizational objectives. Effective implementation should help reduce turnover, strengthen workforce skills, and support a safe, reliable, and resilient transportation system across Maryland.

## Appendix

### Facility Maintenance Technician Feedback Survey

Dear Facility Maintenance Technician,

The MDOT SHA is looking at how we can make our training better. We want to hear from you because your thoughts and feelings matter to us. We've put together a comprehensive survey to hear what you think about your job and the training you've received. Your honest answers will help us make your work and learning experience even better. Every voice count, and together, we can make MDOT SHA a great place to work!

#### **PART-I Demographic Questions**

How long have you been employed by the State of Maryland?

- 1-6 months
- 6-12 months
- 1-2 years
- 2-5 years
- 5+ years

What is your current role in your career?

- FMT I
- FMT II
- FMT III

Did you have your CDL before coming into MDOT SHA?

- Yes
- No

In the next 5 years, how far would you like to progress in your career?

- FMT series
- Team Leader
- FMS-1
- ARME
- RME or above
- Other: \_\_\_\_\_

How can MDOT SHA assist with your development to reach your professional goals?

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What is the highest level of education you have completed?

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Which Shop are you working in?

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Please enter today's date (MM/DD/YYYY):

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**PART-II Job Satisfaction of FMT**

*Please rate from 1-6 for the following statement. 1 = disagree very much, 2 = disagree moderately, 3 = disagree slightly, 4 = agree slightly, 5 = agree moderately, 6 = agree very much*

**Professional Growth**

I feel that my job allows me to develop new skills.	1	2	3	4	5	6
I feel like my job utilizes my skills as much as it could.	1	2	3	4	5	6
I feel that MDOT SHA offers good chances for promotions and moving up.	1	2	3	4	5	6

**Job Satisfaction/Happiness**

I feel like my work matters and people appreciate it.	1	2	3	4	5	6
I have the safety equipment, tools, and training to do my job right.	1	2	3	4	5	6
My workload feels about right, not too crazy.	1	2	3	4	5	6
It seems like everyone on my team gets a fair share of the work.	1	2	3	4	5	6
I'd encourage my friends to work here.	1	2	3	4	5	6
If I had to start over, I'd choose this job again.	1	2	3	4	5	6

**Payment/Benefits**

I feel my salary is adequate for the work I do.	1	2	3	4	5	6
I know about MDOT SHA's Advanced Education Program and its benefits.	1	2	3	4	5	6
I know about MDOT SHA's employer match 401k Program and its benefits.	1	2	3	4	5	6
MDOT SHA's health insurance is good compared to others.	1	2	3	4	5	6
I get leave time when I need it.	1	2	3	4	5	6

**Promotion**

If you do well, you have a good chance of getting promoted.	1	2	3	4	5	6
People get promoted as fast as they do in other places.	1	2	3	4	5	6

**Management**

The management is competent and transparent.	1	2	3	4	5	6
My direct supervisor (Team Leader) asks for feedback and values it when it's offered.	1	2	3	4	5	6
The upper supervisors (FMS, ARME, RME) ask for feedback and values it when it's offered.	1	2	3	4	5	6
My direct supervisor (Team Leader) appreciates what I do.	1	2	3	4	5	6
The upper supervisors (FMS, ARME, RME) appreciates what I do.	1	2	3	4	5	6
Communication seems good within this organization.	1	2	3	4	5	6

**PART-III: Perception of the Training Program**

**3.1 Training programs provided by Office of Maintenance**

Choose the training programs you have participated or currently participating in (select that all apply)

- FMCSA Training
- American Traffic Safety Services Association (ATSSA) Flagger Certification training
- Equipment Certifications
- Other:

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## Training Experience

For the training programs you **have finished or are currently participating in**, please rate from 1-6 for the following statement. 1 = disagree very much, 2 = disagree moderately, 3 = disagree slightly, 4 = agree slightly, 5 = agree moderately, 6 = agree very much

The training opportunities provided are sufficient for doing my job well and safely.	1	2	3	4	5	6
I can choose from different training types that fit what I like and can do.	1	2	3	4	5	6
The training program supports my advancement opportunities.	1	2	3	4	5	6
The training materials are complete and clear.	1	2	3	4	5	6
The training sessions are well-organized and structured.	1	2	3	4	5	6
I am happy with the amount of hands-on practice during training.	1	2	3	4	5	6
The trainers know a lot and are easy to talk to.	1	2	3	4	5	6
The trainers talk clearly and involve us during the training.	1	2	3	4	5	6
I am able to give feedback and ask questions during training.	1	2	3	4	5	6
When I apply what I learned from training, I get enough support.	1	2	3	4	5	6
I'm happy with the follow-up I get after training.	1	2	3	4	5	6

## Training Improvements

I think the training program should be improved or changed.

- Yes
- No

If so, what parts of the training programs could be improved to better support your job performance?

- How long and tough the training is
- More real work examples and practice
- More training stuff like books or tools
- The same way of training everywhere in MDOT SHA

- All of these

What other improvements or changes would you suggest for the training program?  
*Please be honest in your answers. What you say is private and your name won't be shared. Your true thoughts help us make everything better.*

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### **3.2 Training programs provided by Organizational Development Division**

Choose the training programs you have heard about. (select that all apply)

- Northbound 10
- Professional Enrichment Program (PEP)
- The Engineer Experience (Formerly GETP)
- The Facility Maintenance Experience
- Employee Onboarding Program
- New Employee Orientation
- Mentoring & Development Program (MDP)
- Society for Human Resources Management (SHRM)
- Professional Engineer (PE) Prep
- Cornerstone On Demand (CSOD)
- Employee Development Day
- Advanced Education Program (AEP)

Choose the training programs you have finished or are currently participating in. (select that all apply)

- Northbound 10
- Professional Enrichment Program (PEP)
- The Engineer Experience (Formerly GETP)
- The Facility Maintenance Experience
- Employee Onboarding Program
- New Employee Orientation
- Mentoring & Development Program (MDP)
- Society for Human Resources Management (SHRM)

- Professional Engineer (PE) Prep
- Cornerstone On Demand (CSOD)
- Employee Development Day
- Advanced Education Program (AEP)

For the training programs you **DID NOT** participate in, what are the reasons that you did not participate in certain training programs? (select that all apply)

- I am not interested in the training program.
- This training program is not relevant to my current work.
- I did not meet the requirements.
- I did not have a chance to participate in the training program.
- I plan to participate at a later time.

### Training Experience

For the training programs you **have finished or are currently participating in**, please rate from 1-6 for the following statement. 1 = disagree very much, 2 = disagree moderately, 3 = disagree slightly, 4 = agree slightly, 5 = agree moderately, 6 = agree very much.

The training opportunities provided are sufficient for doing my job well and safely.	1	2	3	4	5	6
I can choose from different training types that fit what I like and can do.	1	2	3	4	5	6
The training program supports my advancement opportunities.	1	2	3	4	5	6
The training materials are complete and clear.	1	2	3	4	5	6
The training sessions are well-organized and structured.	1	2	3	4	5	6
I am happy with the amount of hands-on practice during training.	1	2	3	4	5	6
The trainers know a lot and are easy to talk to.	1	2	3	4	5	6
The trainers talk clearly and involve us during the training.	1	2	3	4	5	6
I am able to give feedback and ask questions during training.	1	2	3	4	5	6
When I apply what I learned from training, I get enough support.	1	2	3	4	5	6
I'm happy with the follow-up I get after training.	1	2	3	4	5	6

## Training Improvements

I think the training program should be improved or changed.

- Yes
- No

If so, what parts of the training programs could be improved to better support your job performance?

- How long and tough the training is
- More real work examples and practice
- More training stuff like books or tools
- The same way of training everywhere in MDOT SHA
- All of these

What other improvements or changes would you suggest for the training program?

*Please be honest in your answers. What you say is private and your name won't be shared. Your true thoughts help us make everything better.*

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## Facility Maintenance Technician Trainer Survey

Dear Facility Maintenance Technician Trainers,

MDOT SHA is committed to enhancing our training programs. Your experience and insights as trainers are invaluable to us. We invite you to participate in a focused survey to share your thoughts on our training methods, challenges, and resources. Your honest feedback will directly inform improvements, helping us support you and our technicians more effectively. Together, we can elevate the standard of our training at MDOT SHA. Thank you for your valuable contribution to this project.

### **PART-I Demographic Questions.**

Which department do you work for?

- Office of Maintenance
- Organizational Development Division

What is your current role in your career?

- Team Leader
- FMS-1
- ARME
- RME or above
- Other:

Which training program have you taught (OOM)?

- FMCSA Training
- American Traffic Safety Services Association (ATSSA) Flagger Certification training
- Equipment Certifications
- Temporary Traffic Control Traffic Manager Training
- Others:

Which training program have you taught (OD)?

- Northbound 10
- Professional Enrichment Program (PEP)
- The Engineer Experience (Formerly GETP)
- The Facility Maintenance Experience
- Employee Onboarding Program
- New Employee Orientation
- Mentoring & Development Program (MDP)
- Society for Human Resources Management (SHRM)

- Professional Engineer (PE) Prep
- Cornerstone On Demand (CSOD)
- Employee Development Day
- Advanced Education Program (AEP)

## **PART-II Satisfaction and Effectiveness of Training Programs**

Do you prepare the materials by yourself?

- Yes
- No

How satisfied are you with the training materials provided?

- Very Unsatisfied
- Unsatisfied
- Neutral
- Satisfied
- Very Satisfied

How effectively do you think the training programs address the practical aspects of the job?

- Not effectively at all
- Slightly effectively
- Moderately effectively
- Very effectively
- Extremely effectively

To what extent do you feel the training programs prepare trainees for their roles?

- Not at all prepared
- Slightly prepared
- Somewhat prepared
- Very prepared
- Fully prepared

Do you believe there is a clear progression path for trainees following the training programs?

- Strongly disagree
- Disagree
- Neutral
- Agree
- Strongly agree

What components of the training program do you find most valuable, and why?

Can you describe a particular training session that you found very effective? What made it stand out?

In your opinion, what are the strengths and weaknesses of the training program?

How could the training programs be improved to better serve the needs of the trainees?

Have you received any feedback from trainees that you think should be acted upon? Please elaborate.

What additional topics or skills do you believe should be included in future training programs?

Is there anything you would change about the structure or delivery of the training programs?

### **PART-III Feedback on Training Outcomes**

Do you follow up on the trainees' performance post-training?

- Yes
- No
- Sometimes

Please describe how you measure the impact of your training on trainees' performance.

Can you provide examples of success stories or significant improvements you've observed in trainees after completing the program?

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