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TRB Webinar: Construction Inspectors Training and Certification

October 11, 2024

12:00 – 1:30 PM



PDH Certification Information

1.5 Professional Development Hours (PDH) – see follow-up email

You must attend the entire webinar.

Questions? Contact Andie Pitchford at TRBwebinar@nas.edu

The Transportation Research Board has met the standards and requirements of the Registered Continuing Education Program. Credit earned on completion of this program will be reported to RCEP at RCEP.net. A certificate of completion will be issued to each participant. As such, it does not include content that may be deemed or construed to be an approval or endorsement by the RCEP.



Purpose Statement

This webinar will provide an overview of NCHRP Report 1027: Guide to Recruiting, Developing, and Retaining Transportation Infrastructure Construction Inspectors and how departments of transportation can develop new inspectors to perform inspections correctly and accurately to counter declining projected workforce attrition rates.

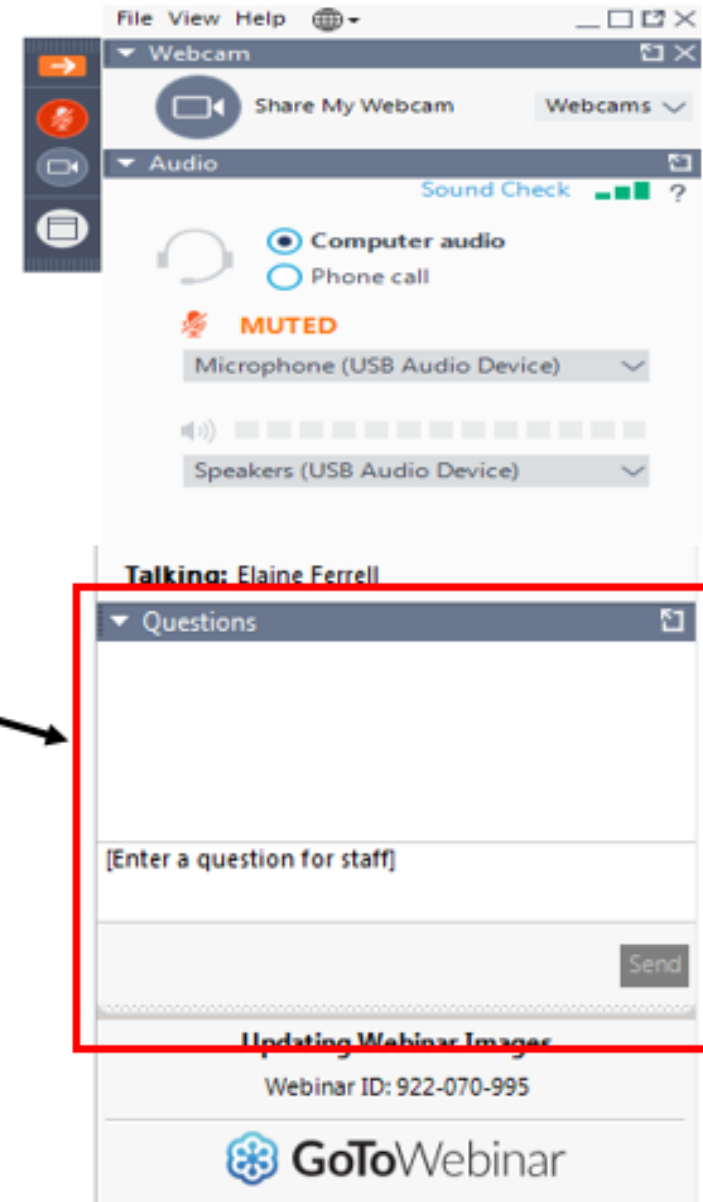
Learning Objectives

At the end of this webinar, you will be able to:

- (1) Develop training strategies for the transportation infrastructure construction workforce
- (2) Develop strategies for certification of transportation construction inspectors
- (3) Provide recruitment, retention, and career development opportunities for construction inspectors

Questions and Answers

- Please type your questions into your webinar control panel
- We will read your questions out loud, and answer as many as time allows



Today's presenters



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**NATIONAL
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Construction Inspector Training and Certification

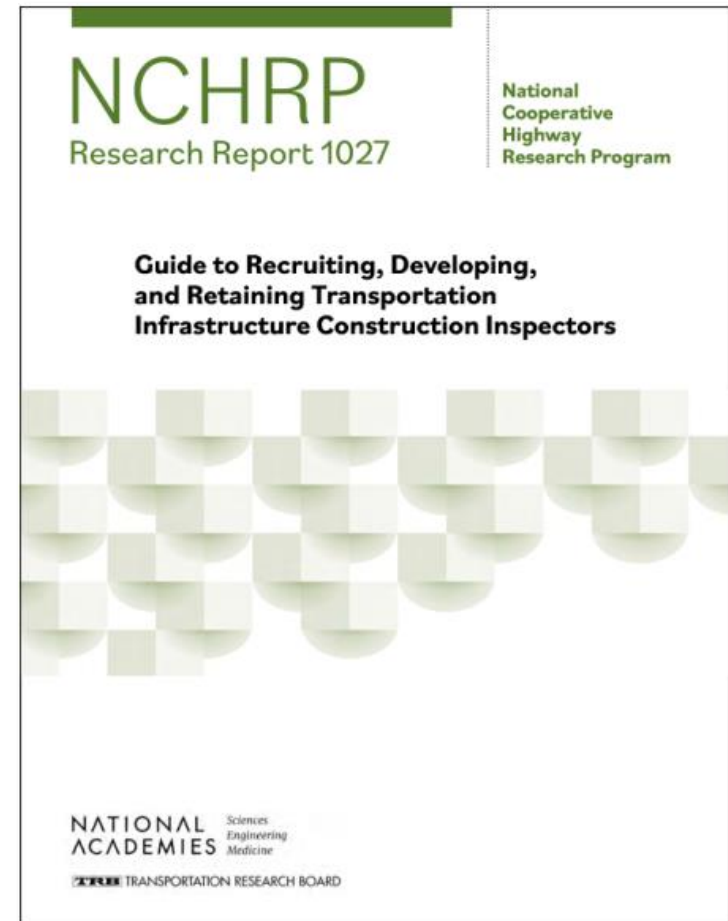
NCHRP Project 23-05

NCHRP Report 1027

October 11, 2024

Agenda

- Research Team and Presenters
- Introduction and Background
- Purpose
- Objectives
- Methodology
- Construction Inspector Development Guide
 1. Needs Assessment and Recruitment
 2. Core Competencies and KSA Assessment
 3. Training and Certification
- Q & A



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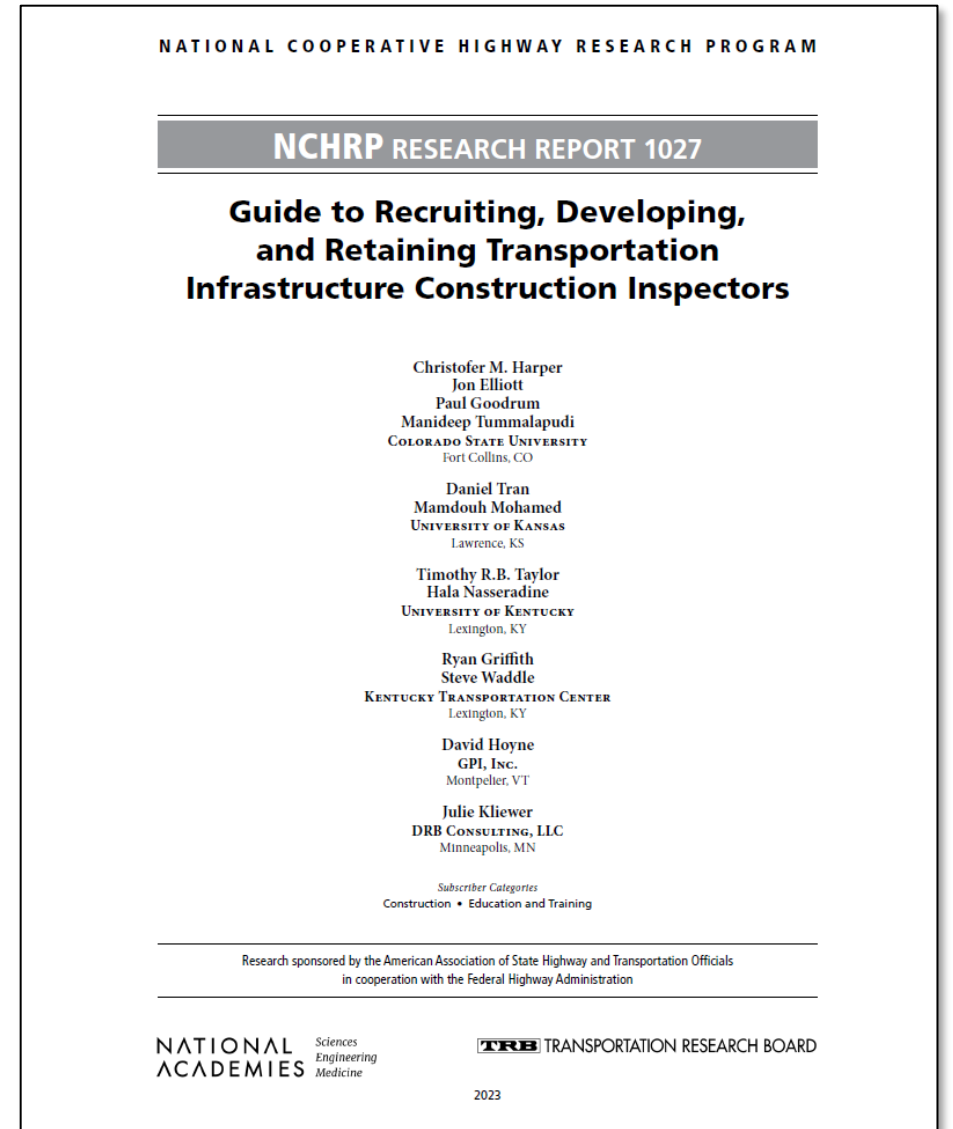
Presenters

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Mr. David Hoyne, P.E.
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Introduction – Transportation Construction Inspectors

- Construction Inspectors are crucial for ensuring highway projects meet quality standards and offer long-term value
- State DOTs face construction inspection workforce shortages due to retirements and attrition
- State DOTs struggle to attract, recruit, train, certify, and retain inspection staff
- State DOTs are grappling with increasing highway construction work and a decreasing number of inspectors
- Shortage of certified/qualified inspectors can negatively impact project quality, safety, cost, and time



Source: Wikimedia Commons

Background

- Younger generations not interested in construction inspection careers
- Not enough training resources available for younger inspectors
- Construction inspection employment is projected to grow at a rate of 7% faster than other transportation construction careers (US BLS)
- State DOTs hire third-party consultants to fill the workforce gap; however, consultants too are experiencing a workforce shortage, and the result is overworked, less experienced inspectors
- Insufficient recruitment of new inspectors, necessitating efforts to attract and retain a diverse workforce



Source: Florida DOT

Background

- Transportation Construction Inspector Development Challenges
 - Loss of institutional knowledge caused by attrition/retirements
 - Limited or capped amount of DOT inspection positions
 - Difficulty attracting individuals to inspection positions
 - Variability in construction inspector training and certification programs
 - Limited resources, funding, and time to develop and deliver training programs
 - Inconsistent inspection practices caused by a lack of operations manuals and procedures
 - Limited internships, mentoring, and on-the-job learning experiences available
 - Difficulty mapping education, industry experience, and training needs for construction inspectors
 - Skill sets for inspectors are changing with the use of technologies



Source: Utah DOT

Purpose

- Create guidance for State DOTs and their industry partners to recruit, retain, develop Construction Inspectors, and with develop and maintain Construction Inspector training and certification programs



Source: Wikimedia Commons (Massachusetts DOT)

Objectives



Identify and analyze gaps and needs for CIs in core competencies, and formal and informal education



Investigate and develop training strategies to meet the needs of the CI workforce



Investigate and develop strategies for certification programs that are transferable across multiple state DOTs



Identify professional development opportunities for CIs to further their core competencies and changing inspection requirements



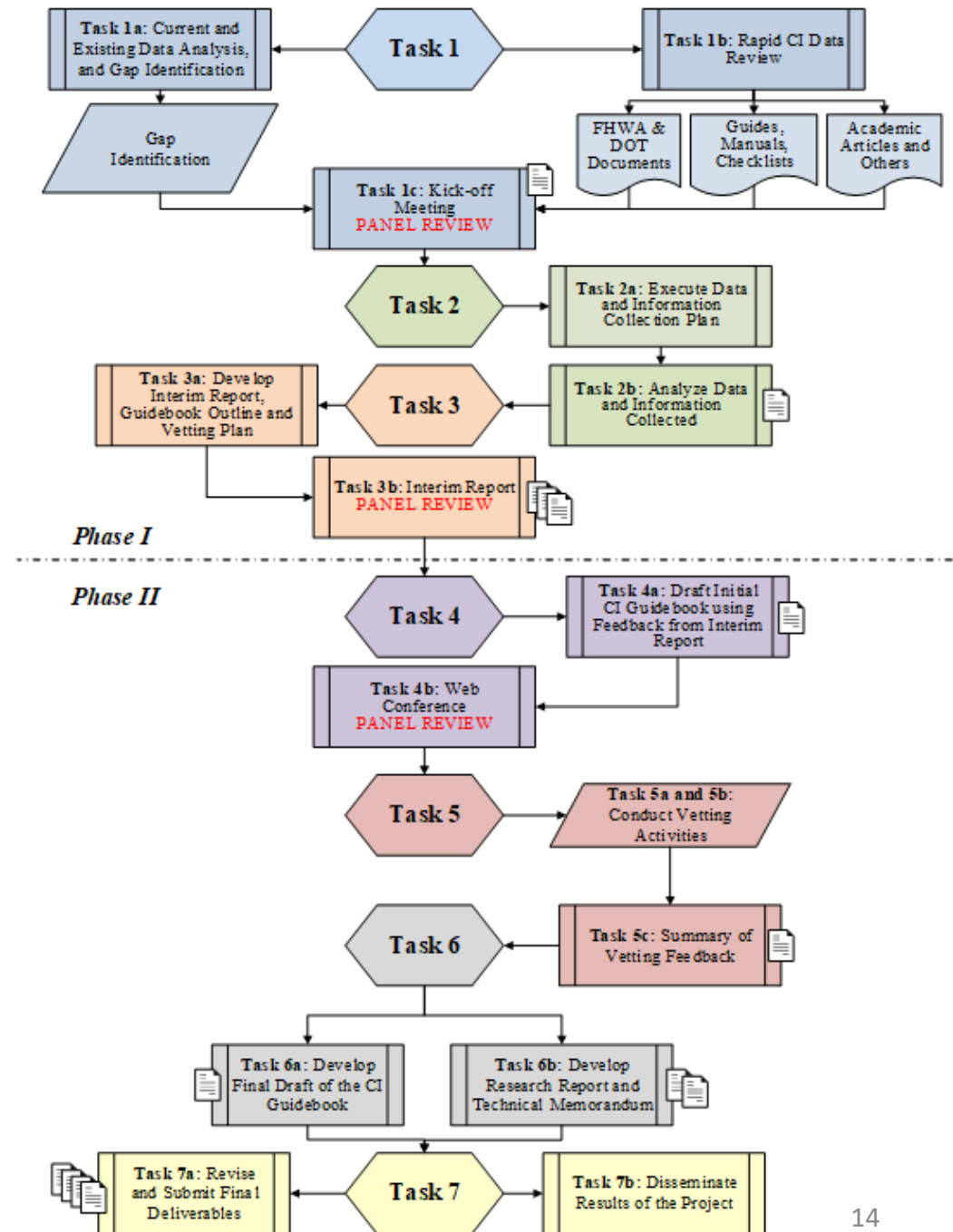
Determine strategies for recruiting and retaining a CI workforce



Investigate competencies needed for CIs to perform inspections using technologies

Methodology

- Phase I – Data Collection
 - Task 1: Create Data and Information Collection Plan
 - Task 2: Collect and Analyze Data and Information
 - Task 3: Produce Phase I Deliverables
- Phase II – Guide Development
 - Task 4: Create CI Training and Certification Program Development Guidebook
 - Task 5: Vet CI Guidebook with Industry Professionals
 - Task 6: Create Final Deliverables
 - Task 7: Finalize Deliverables and Disseminate Results



Methodology Phase I: Data Collection

- Rapid Desk Scan
- Extensive literature review and annotated bibliography
- DOT Survey: 57 responses from 46 DOTs
- Consultant Survey: 30 responses from 26 consultant inspection firms
- DOT Interviews: Conducted 6
- Consultant Interviews: Conducted 7
- Three Focus Groups
 - 1: DOT Human resources staff from
 - 2: Construction inspector trainers from DOTs and construction organizations
 - 3: Third-party consultant inspectors

Methodology Phase II: Guide Development

- First draft of Guide
 - Created and provided to Panel for review
 - Revised based on initial feedback
- Second draft of Guide
 - Four virtual vetting sessions were conducted
 1. Group of industry professionals that also participated in the focus groups
 2. Colorado DOT
 3. Vermont Agency of Transportation
 4. Kentucky Transportation Cabinet
- Third draft of Guide
 - Revised based on vetting feedback
 - Submitted to Panel for Review
- Final draft of Guide
 - Revised based on final comments received from Panel

Transportation Construction Inspector Development Guide



1. NEEDS ASSESSMENT AND
RECRUITMENT

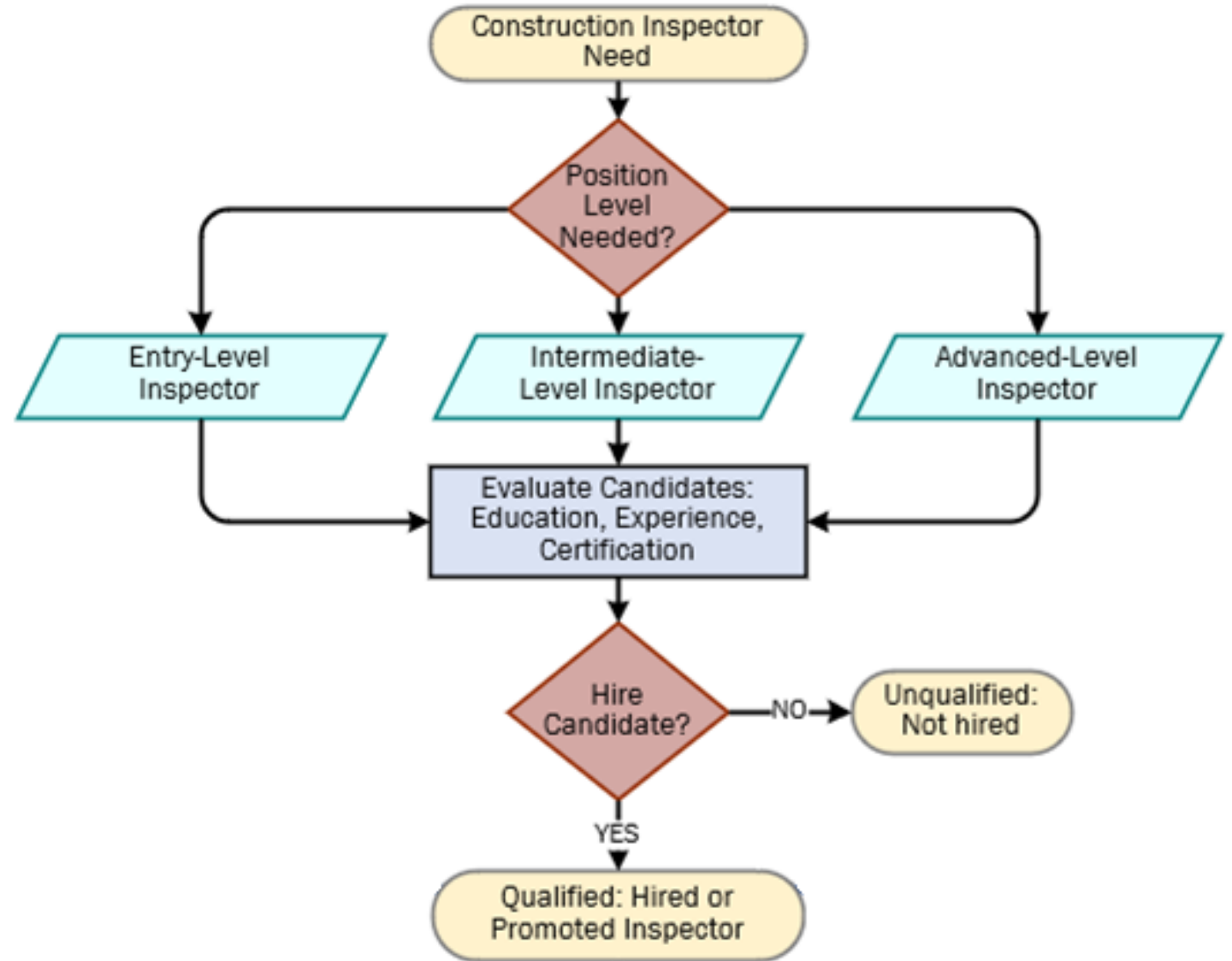


2. CORE COMPETENCIES AND
KNOWLEDGE, SKILLS, AND
ABILITIES (KSA) ASSESSMENT



3. TRAINING AND CERTIFICATION

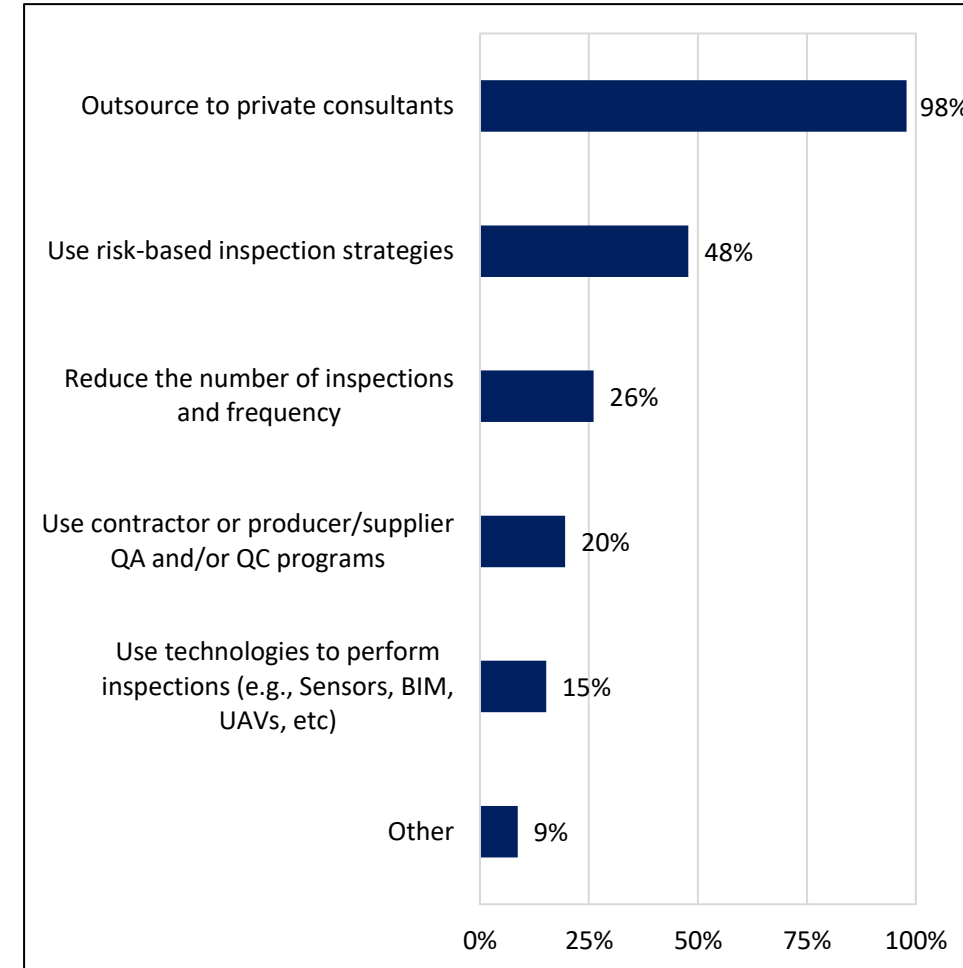
1. Needs Assessment and Recruitment



Recruiting Construction Inspectors

- Identify need
 - Quantity of inspectors needed based on workload
 - Identify inspection skillsets needed based on workload
- Evaluate education, experience, and certifications
 - High school/higher education
 - Construction experience
 - Inspection experience
 - DOT certifications
 - Construction organization certifications
- Determine inspection position type
 - Full-time
 - Seasonal
 - 3rd Party Consultant
- Determine inspection position level
 - Entry: 0-3 years exp; requires training
 - Intermediate: 4-8 years exp; increase in responsibilities
 - Advanced: 8+ years exp; supervision responsibilities

Approaches used by DOTs to address in-house inspector shortages



Data from DOT and Consultant Surveys

Identify Construction Inspection Needs

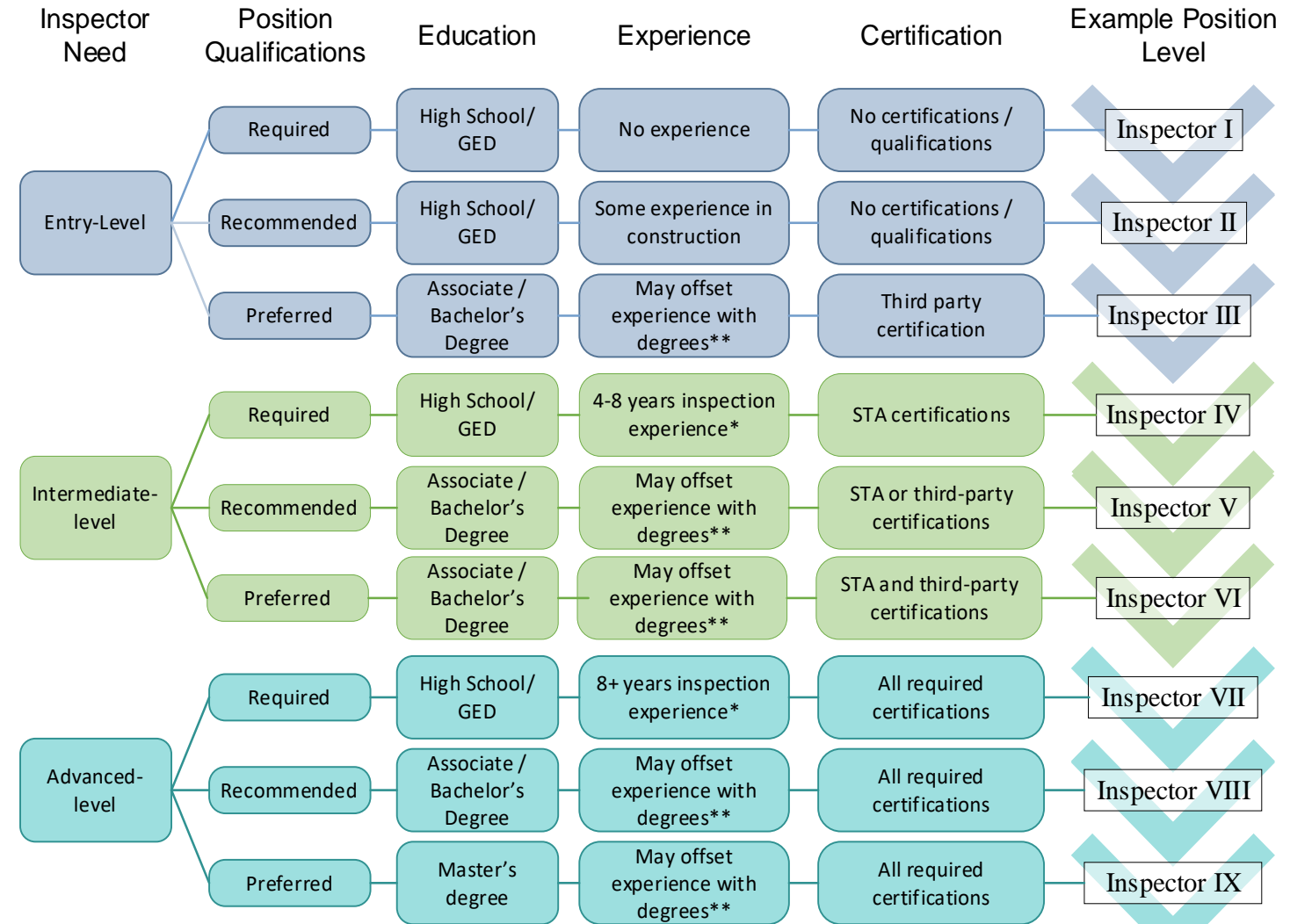
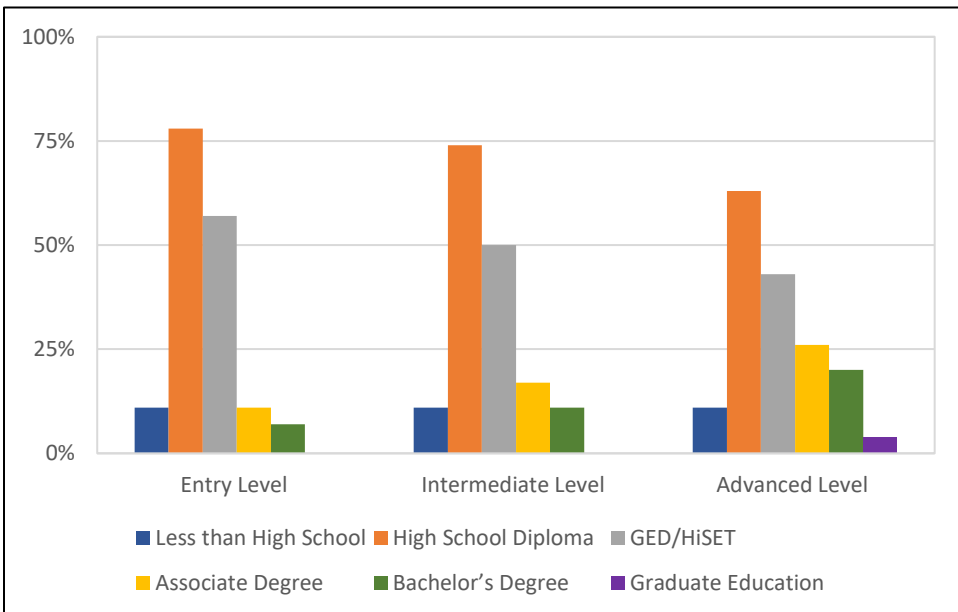
- The DOTs need for construction inspectors depends on:
 - The quantity of current inspection staff
 - Experience and knowledge of the current staff
 - The DOT's projected workload
- Identifying the competencies a transportation construction inspector should possess for is crucial for recruitment and ensures competent inspectors are hired.
- DOTs need to continuously focus on developing full-time inspectors

Education, Experience, and Certification Matrix

Useful for evaluating candidates applying construction inspection positions

Adapt to match DOT operations

Education requirements for Inspectors

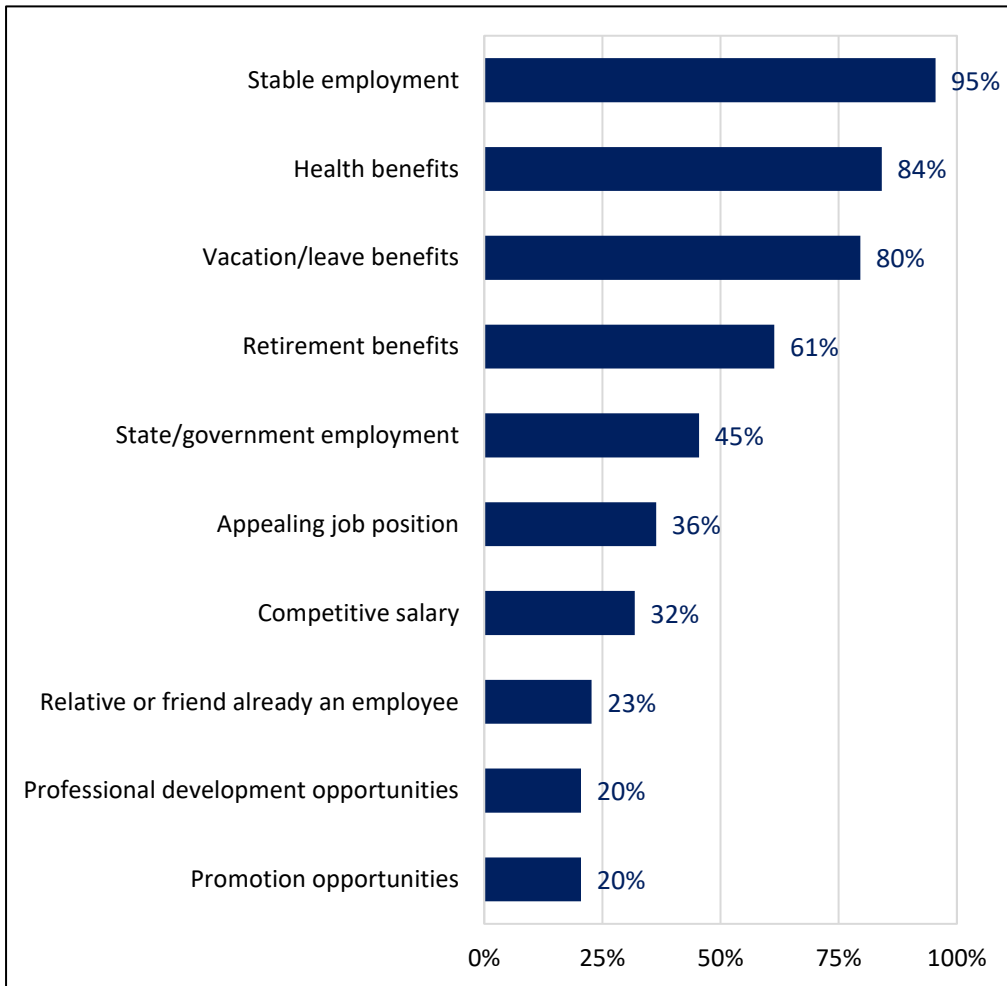


* Experience requirements determined by the STA

** Education to offset experience is determined by the STA

Recruitment Strategies

Recruitment Strategies Used by DOTs and Consultants



Data from DOT and Consultant Surveys

Recruitment Strategy	Description
<i>Appealing job position</i>	Offering construction inspection positions that are appealing to a large audience. Highlighting the ability to work outside, with technologies, and on important infrastructure projects that improve our community and society.
<i>Education support/tuition reimbursement</i>	Providing benefits to offset the costs for external continuing education, training, and certification of construction inspectors.
<i>Health benefits</i>	Providing affordable healthcare to employees, including medical, dental, vision, and mental health benefits.
<i>Paid time off</i>	Providing time for employees to take paid time off from work. Includes paid time off for vacation and leave purposes.
<i>Promotion opportunities</i>	Show potential candidates that construction inspection is a career. Offering the potential to advance to higher construction inspection positions shows that career paths are available for inspectors.
<i>Retirement benefits</i>	Providing comprehensive retirement packages that set up employees to live comfortably once they retire from the DOT.
<i>Simple application process</i>	Provide an application process that is streamlined and easy for any candidate to complete, and the hiring process is completed in a timely manner.
<i>Stable employment</i>	Transportation agencies typically are not susceptible to economic changes, making working for the DOT more stable than working for a private sector construction firm.
<i>Service to communities and society</i>	Promote the importance of working for a state agency that provides services for improving communities and the surrounding societies. Providing a sense of purpose tends to draw in younger workers who focus on making a difference in their careers to the community and society.

Measuring DOT Recruitment Programs

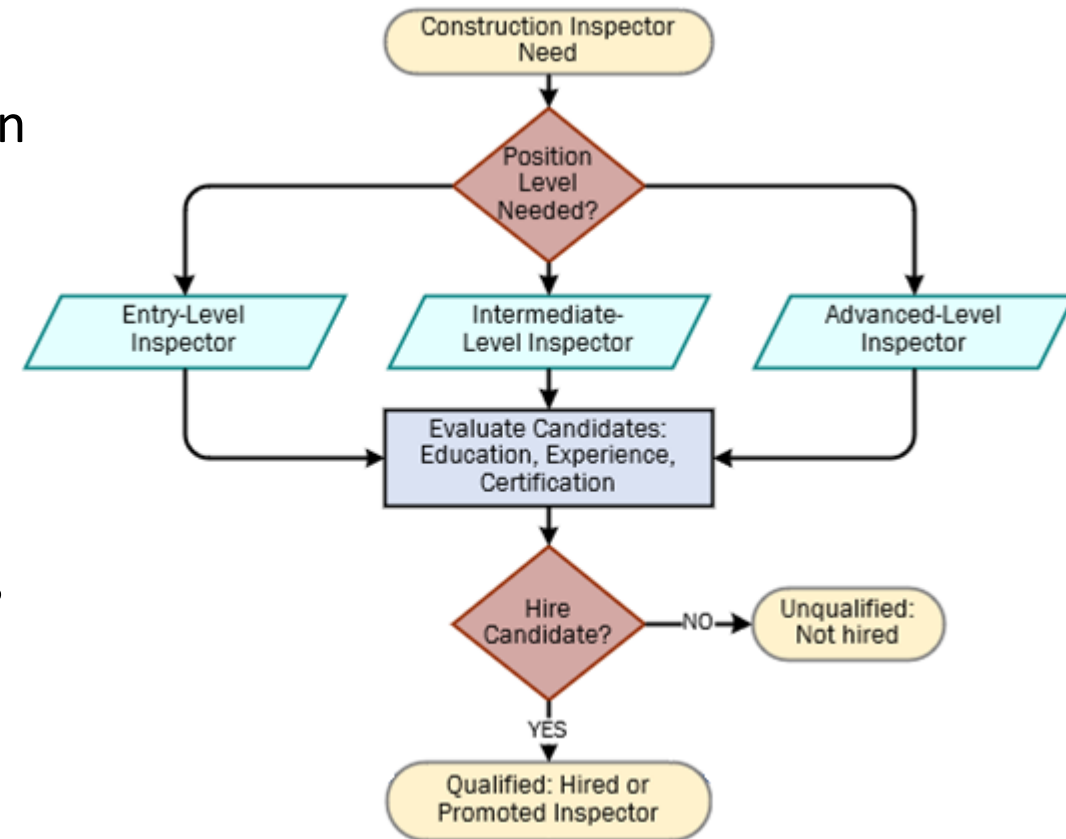
Performance Indicators for construction inspector recruitment programs

- ✓ Example targets provided
- ✓ Adapt targets to match DOT operations

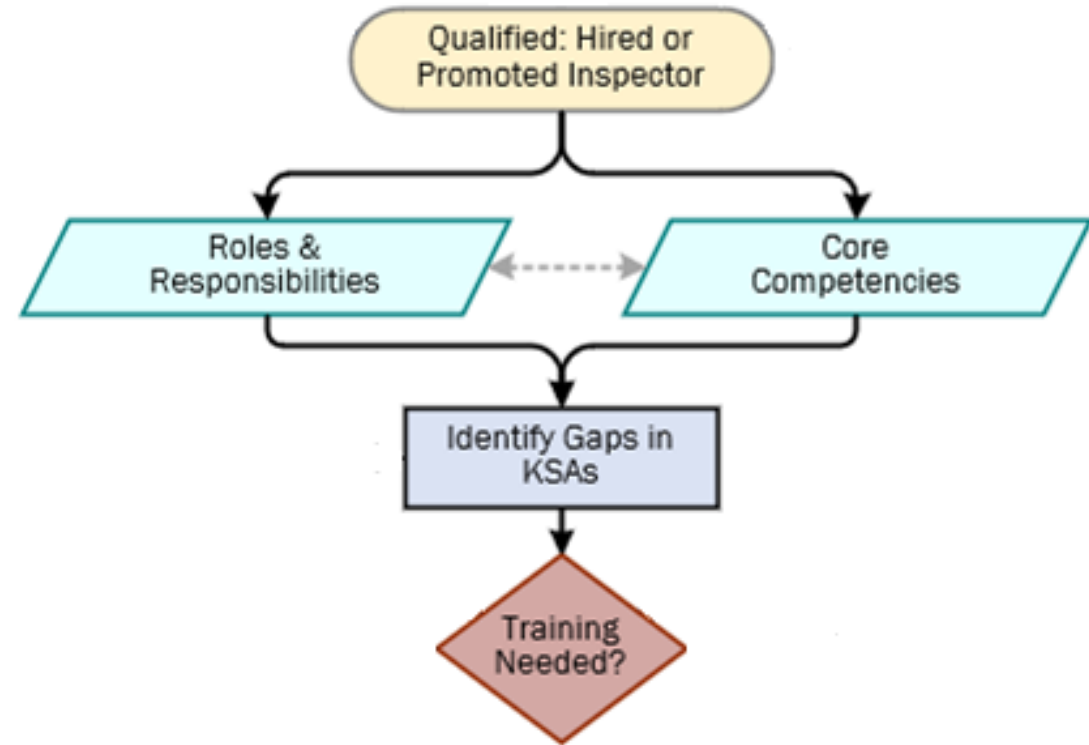
Key Performance Indicator	Description	Example Target
<i>Applicants received per advertised position</i>	The total number of applicants per position that can be compared across advertised construction inspection positions	20 candidates applied for the advertised construction inspection position
<i>Conversion rate</i>	Total number or percentage of accepted positions compared to offers letters sent	At least 80% of candidates that receive an offer letter accept the inspection position
<i>Interns hired annually</i>	Total number of interns hired each year	Hiring the same number of interns annually
<i>Intern conversion rate</i>	Total number or percentage of interns accepting positions compared to offer letters sent	At least 80% of interns who receive a full-time offer letter accept the inspection position
<i>New full-time hires annually</i>	Total number of full-time construction inspectors hired each year and comparing annual results	Hiring the same number of new hires annually
<i>New seasonal hires annually</i>	Total number of seasonal construction inspectors hired each year and comparing annual results	Hiring similar new hires each year or decrease in hiring each year
<i>Outside sources used per advertised position</i>	Total number of outside sources (job boards, job fairs, etc.) used to find applicants	Using at least five outside sources to advertise open construction inspection positions
<i>Planned inspector need vs. actual inspectors hired</i>	Comparing the number of inspectors needed to the actual number of inspectors hired	At least 80% of advertised positions are filled annually
<i>Promoted inspectors annually</i>	Total number of internal construction inspectors promoted to new positions	20% of inspectors with at least one year of experience with the DOT receive a promotion annually

Summary: Needs Assessment & Recruitment

- Identify the need for inspectors based on current workforce size and skillsets and the DOT transportation construction workload
- Implement recruitment strategies to find quality candidates
- Evaluate applications for relevant education, experience, and alignment with the skillsets needed
- Consider hiring third-party consultant inspection firms to meet the construction inspection need of the DOT



2. Core Competencies and Knowledge, Skills, and Abilities (KSA) Assessment



Core Competencies and KSA Assessment

- Common Construction Inspector Responsibilities

- More responsibilities become important as an inspector advances in position

Responsibilities	Entry	Intermediate	Advanced
Coordinating field activities to ensure adherence to plans and specifications	Red	Yellow	Green
Documenting payment quantities	Green	Green	Green
Ensuring contract requirements and project compliance	Yellow	Green	Green
Ensuring shop drawings are accurate and approved	Red	Orange	Green
Monitoring corrective actions taking place for identified issues	Orange	Green	Green
Measuring and recording material quantities	Green	Green	Green
Notifying the project management team when issues arise	Green	Green	Green
Performing surveying assignments	Red	Orange	Orange
Performing tests for specification compliance	Orange	Orange	Orange
Providing potential solutions to inspection issues	Red	Green	Green
Reviewing quantities for payment applications	Orange	Yellow	Green
Sampling and testing of materials in the field	Yellow	Yellow	Orange
Sampling and testing of materials in a laboratory	Red	Orange	Red
Supervising surveying crew	Red	Red	Yellow
Understanding contract requirements and project objectives	Orange	Green	Green
Verifying and documenting as-built conditions of the work	Yellow	Green	Green
Verifying contractor workmanship for contract compliance	Yellow	Green	Green
Working various hours and schedules as required	Green	Green	Green

KEY:

- 100-75% of DOTs responded that this is an important responsibility
- 74-50% of DOTs responded that this is an important responsibility
- 49-25% of DOTs responded that this is an important responsibility
- 24-0% of DOTs responded that this is an important responsibility

Academic Competencies

	KSA	Definition
Academic Competencies	Computer Skills/Digital Literacy	Able to use required technologies or computer-related tools and applications
	Critical & Analytical Thinking	Analyze, evaluate, question, and interpret information
	Basic Math	Perform basic calculations using mathematical principles such as arithmetic and algebra
	Advanced Math	Perform more complex calculations using mathematical principles such as geometry and trigonometry
	Reading/Literacy	Understand and interpret written information presented in work-related documents
	Science	Apply scientific rules and methods to conduct tests and solve problems
	Written Communication	Clearly communicate important information to others in writing
	Oral Communication	Clearly communicate important information to others through verbal discussions

KSAs learned in an educational setting, typically through K-12 schooling and higher education

Technical Competencies

	KSA	Definition
Technical Competencies	Contract Requirements	Able to understand contract requirements associated with the work and the requisite experience with the work to be an effective inspector
	Tools & Technologies	Able to use appropriate tools and technology to perform and record the work, including cameras, videos, tablets, and smart applications
	Inspecting & Testing	Able to inspect, test materials, and document work
	Construction Materials	Able to identify and manage work associated with materials (e.g., compile existing sign inventory, guard rail inventory, materials designated for salvage, materials designated for reuse, materials found on a project for use)
	Construction Means & Methods	Knowledge of construction materials, means, and methods and able to apply knowledge when inspecting
	Plans & Specifications	Able to understand and use the project plans and specifications for inspections
	Performance Measures	Knowledge and application of developing, tracking, and reporting performance measures
	Quality Control/Quality Assurance	Knowledge of quality control and quality assurance principles
	Risk	Knowledge of risk identification and analysis
	Surveying	Knowledge of surveying and working with surveyors
	Safety	Knowledge of construction safety and the ability to recognize unsafe situations at the job site
	Project Development	Knowledge of the project development process
	Regulations, Policies, & Procedures	Understanding and applying agency regulations, policies, and procedures
	Construction Scheduling	Understanding project master schedule and progress schedules
Verification	Able to perform and verify project controls, alignment, layout, and beam profiles using appropriate tools and technology (e.g., total station, GPS, LiDAR, RTK)	

Specific KSAs needed to perform construction inspection tasks

Personal Effectiveness Competencies

	KSA	Definition
Personal Effectiveness Competencies	Adaptability & Flexibility	Exhibit the capacity to adapt to changing conditions on a project effectively
	Dependability & Reliability	Exhibit the traits of being responsible and accountable at work
	Desire to Learn	Demonstrate the willingness to learn new information for performing inspections and problem solving and decision making
	Initiative	Exhibit the willingness to work
	Integrity	To be honest and respectful of others
	Interpersonal Skills	Demonstrate skills to work with others from various backgrounds and the ability to work through issues and conflicts efficiently
	Leadership	Influence and guide others to improve efforts and achieve goals
	Professionalism	Demonstrate adherence to the accepted code of conduct for the job

KSAs that represent an individual's personal attributes

Workplace Competencies

	KSA	Definition
Workplace Competencies	Attention to Detail	Meticulously perform inspection tasks
	Building Relationships	Develop and maintain collaborative relationships within the agency and with external organizations that can provide assistance and support
	Check, Examine, & Record Data	Transcribe, record, and maintain information/data in written or electronic format
	Expectation Focus	Setting goals and achieving desired outcomes
	Following Directions	Perform work diligently based on the instruction and management provided
	Planning & Organizing	Use logical and systematic processes to achieve goals; Prioritize workload to ensure meeting of deadlines
	Problem Solving & Decision Making	Able to identify the cause and effect of problems. Analyze existing information to develop appropriate and sound decisions/solutions
	Teamwork	Demonstrate skills to work efficiently as a team and be aware of others

General KSAs to perform essential work duties

Core Competency and Responsibility Matrix

For Entry-level Inspection Positions

		Responsibilities																	
		Coordinating field activities to ensure adherence to plans and specifications	Documenting payment quantities	Ensuring contract requirements with project compliance	Ensuring shop drawings are accurate and approved	Monitoring corrective actions taking place for identified issues	Measuring and recording material quantities	Notifying project management team when issues arise	Performing surveying assignments	Performing tests for specification compliance	Providing potential solutions to inspection issues	Reviewing quantities for payment applications	Sampling and testing of materials in the field	Sampling and testing of materials in a laboratory	Supervising surveying crew	Understanding contract requirements and project objectives	Verifying and documenting as-built conditions of the work	Verifying contractor workmanship for contract compliance	Working various hours and schedules as required
		Competencies/KSAs																	
Academic	Computer Skills/Digital Literacy		A		A		A		A		A		A		A		A		
	Critical & Analytical Thinking			A	A				A			A		A		A		A	
	Basic Math (Arithmetic, Algebra)		Q				Q		A			Q	Q	Q					
	Advanced Math (Geometry, Trigonometry)		A	A	A		A			A		A	A	A	A				
	Reading/Literacy	Q	Q	Q	A		Q				A					Q			
	Science									A			A	A					
	Written Communication		Q	A			Q	Q		Q		Q	Q	Q			Q	Q	
	Oral Communication	A				A		A			A				A				A
	Construction Materials		A				A	A		A		A	A	A		A	A		
Construction Means & Methods	A	A			A	A	A	A	A						A	A	A		
Construction Scheduling	A																	A	
Contract Requirements		A	A				A			A					A		A		
Inspecting & Testing	A	A	A			A	A	A	A		A	A	A			A	A		
Plans & Specifications	A	A	A	A		A	A	A	A		A					A			
Performance Measures																A	A		
Project Development															A				
Quality Control/Quality Assurance		A	A		A	A	A	A	A	A		A	A			A	A		
Regulations, Policies, & Procedures		A	A				A				A				A	A	A		
Risk	A	A			A		A			A							A		
Safety	A		A		A	A	A	A	A		A	A	A	A		A	A	A	
Surveying								A						A					
Tools & Technologies	A	A	A	A		A		A	A		A	A	A	A		A	A	A	
Verification		A		A	A	A	A		A	A	A	A	A			A	A		

Core Competency and Responsibility Matrix

For Intermediate-level Inspection Positions

		Responsibilities																		
		Coordinating field activities to ensure adherence to plans and specifications	Documenting payment quantities	Ensuring contract requirements with project compliance	Ensuring shop drawings are accurate and approved	Monitoring corrective actions taking place for identified issues	Measuring and recording material quantities	Notifying project management team when issues arise	Performing surveying assignments	Performing tests for specification compliance	Providing potential solutions to inspection issues	Reviewing quantities for payment applications	Sampling and testing of materials in the field	Sampling and testing of materials in a laboratory	Supervising surveying crew	Understanding contract requirements and project objectives	Verifying and documenting as-built conditions of the work	Verifying contractor workmanship for contract compliance	Working various hours and schedules as required	
		Competencies/KSAs																		
	KEY A = Aware Q = Qualified P = Proficient																			
Academic	Computer Skills/Digital Literacy		Q		Q		Q		Q			Q	Q	Q	A		Q	A		
	Critical & Analytical Thinking	A		Q	Q	A		Q			Q		Q	Q		Q	Q	Q	A	
	Basic Math (Arithmetic, Algebra)		P				P		Q	P		P	P	P			A	A		
	Advanced Math (Geometry, Trigonometry)		Q	Q	Q		Q		A	Q		Q	Q	Q	Q					
	Reading/Literacy	P	P	P	Q				A			Q				P				
	Science												Q	Q						
	Written Communication	A	P	Q		A	P	P		P		P	P	P			P	P	Q	
	Oral Communication	Q				Q		Q	A		Q				Q				Q	
Technical Competencies	Construction Materials		Q				Q	Q		Q		Q	Q	Q		Q	Q			
	Construction Means & Methods	Q	Q			Q	Q	Q	Q	Q						Q	Q	Q		
	Construction Scheduling	Q		A		A		A	A		A					A			Q	
	Contract Requirements	A	Q	Q	A			Q	Q		Q					Q		Q		
	Inspecting & Testing	Q	Q	Q			Q	Q	Q	Q		Q	Q	Q			Q	Q		
	Plans & Specifications	Q	Q	Q	Q		Q	Q	Q	Q		Q					Q			
	Performance Measures			A		A		A		A	A					A	A	A		
	Project Development	A		A		A		A								Q				
	Quality Control/Quality Assurance	A	Q	Q	A	Q	A	Q	Q	Q	Q	A	Q	Q	A	A	Q	Q		
	Regulations, Policies, & Procedures	A	Q	Q	A			Q		A	A	Q				Q	Q	Q	A	
	Risk	Q	Q	A	A	Q	A	Q	A	A	Q	A	A	A	A	A	A	A	Q	A
	Safety	Q		Q		Q	Q	A	Q	Q	A	Q	Q	Q	Q	Q	A	A	Q	Q
	Surveying	A	A				A		Q						Q					
	Tools & Technologies	Q	Q	Q	Q		Q		Q		Q		Q	Q	Q	Q		Q	Q	Q
	Verification	Q	Q	A	Q		Q	Q		Q	Q	Q	Q	Q			Q	Q	Q	

Core Competency and Responsibility Matrix

For Advanced-level Inspection Positions

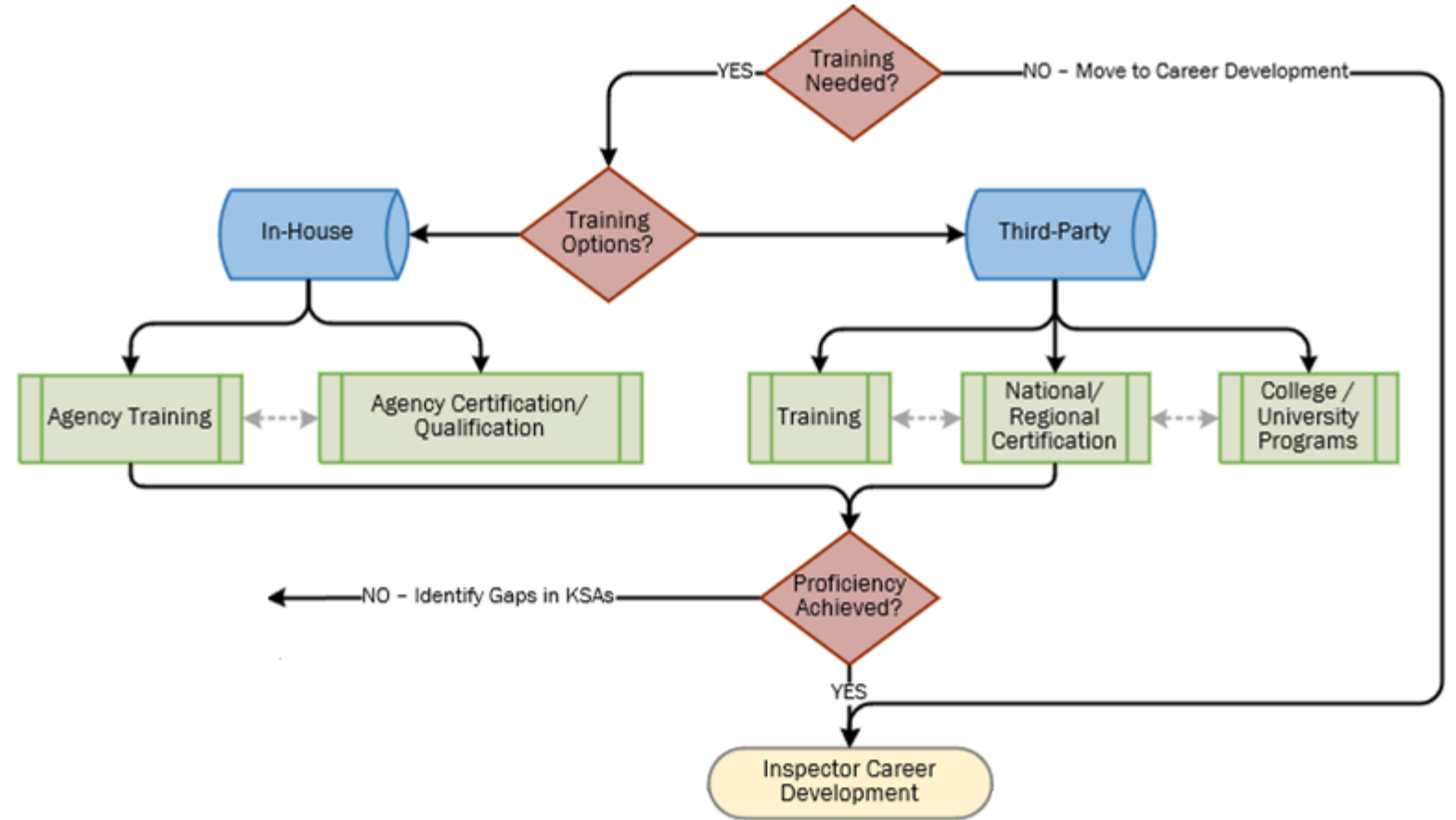
		Responsibilities																	
		Coordinating field activities to ensure adherence to plans and specifications	Documenting payment quantities	Ensuring contract requirements with project compliance	Ensuring shop drawings are accurate and approved	Monitoring corrective actions taking place for identified issues	Measuring and recording material quantities	Notifying project management team when issues arise	Performing surveying assignments	Performing tests for specification compliance	Providing potential solutions to inspection issues	Reviewing quantities for payment applications	Sampling and testing of materials in the field	Sampling and testing of materials in a laboratory	Supervising surveying crew	Understanding contract requirements and project objectives	Verifying and documenting as-built conditions of the work	Verifying contractor workmanship for contract compliance	Working various hours and schedules as required
Competencies/KSAs		KEY A = Aware Q = Qualified P = Proficient																	
Academic	Computer Skills/Digital Literacy		P		P		P		P			P	P	P	Q				
	Critical & Analytical Thinking	P		P	P	Q		P			P					P	P	P	P
	Basic Math (Arithmetic, Algebra)		P				P		P	P		P	P	P			Q	Q	
	Advanced Math (Geometry, Trigonometry)		P	P	P		P		P	P		P	P	P	P				
	Reading/Literacy	P	P	P	P				Q			Q				P			
	Science												P	P					
	Written Communication	P	P	Q		Q	P	P		P		P	P	P			P	P	P
	Oral Communication	P				P		P	Q		P				Q				P
Technical Competencies	Construction Materials		P				P	P		P		P	P	P		P	P		
	Construction Means & Methods	P	P			P	P	P	P	P		Q	Q	Q	Q	P	P	P	
	Construction Scheduling	P		P		P		P	P		P				Q	P			P
	Contract Requirements	Q	P	P	Q			P		P						P		P	
	Inspecting & Testing	P	P	P			P	P	P	P		P	P	P	Q		P	P	
	Plans & Specifications	P	P	P	P		P	P	P	P		P			Q		P		
	Performance Measures	Q		P		Q		Q	Q	Q	Q		Q	Q		Q	Q	Q	
	Project Development	Q		P		P		Q					Q	Q		P			
	Quality Control/Quality Assurance	Q	P	P	Q	P	Q	P	P	P	P	Q	P	P	Q	Q	P	P	
	Regulations, Policies, & Procedures	Q	P	P	Q			P		Q	Q	P				P	P	P	Q
	Risk	P	Q	Q	Q	P	Q	P	Q	Q	P	Q	Q	Q	Q	Q	Q	P	Q
	Safety	P		P		P	P	Q	P	P	Q	P	P	P	P	Q	Q	P	P
	Surveying	Q	Q				Q		P						P				
	Tools & Technologies	P	P	P	P		P		P	P		P	P	P	P		P	P	P
	Verification	P	P	Q	P	P	P	P		P	P	P	P	P			P	P	

Summary: Core Competencies

- Determine roles and responsibilities for all construction inspection positions.
- Determine core competencies an inspector needs to be proficient in to perform responsibilities.
- Align inspection position responsibilities with KSAs.
- Consider the technology skills and knowledge an inspector will need to perform responsibilities.
- Provide necessary training based on the core competency assessment and identifying gaps in KSAs that an inspector needs.

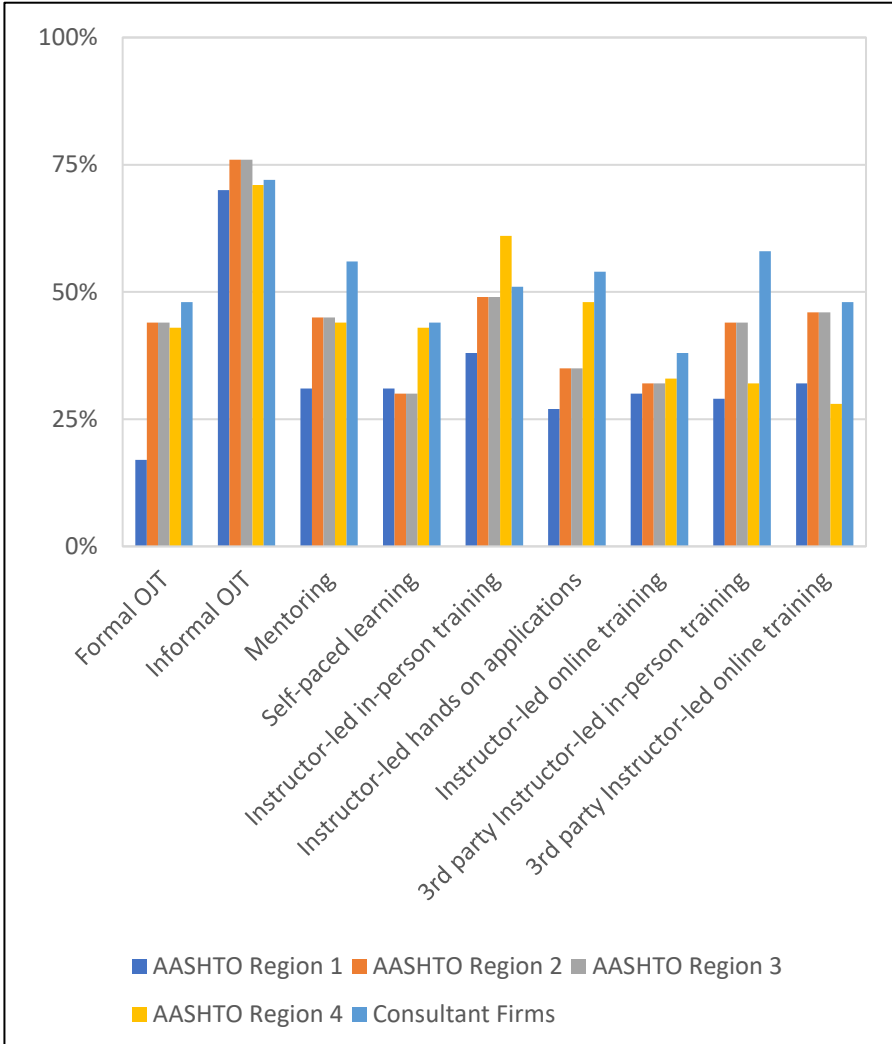


3. Training and Certification



Training Methods

Frequency of using various training methods



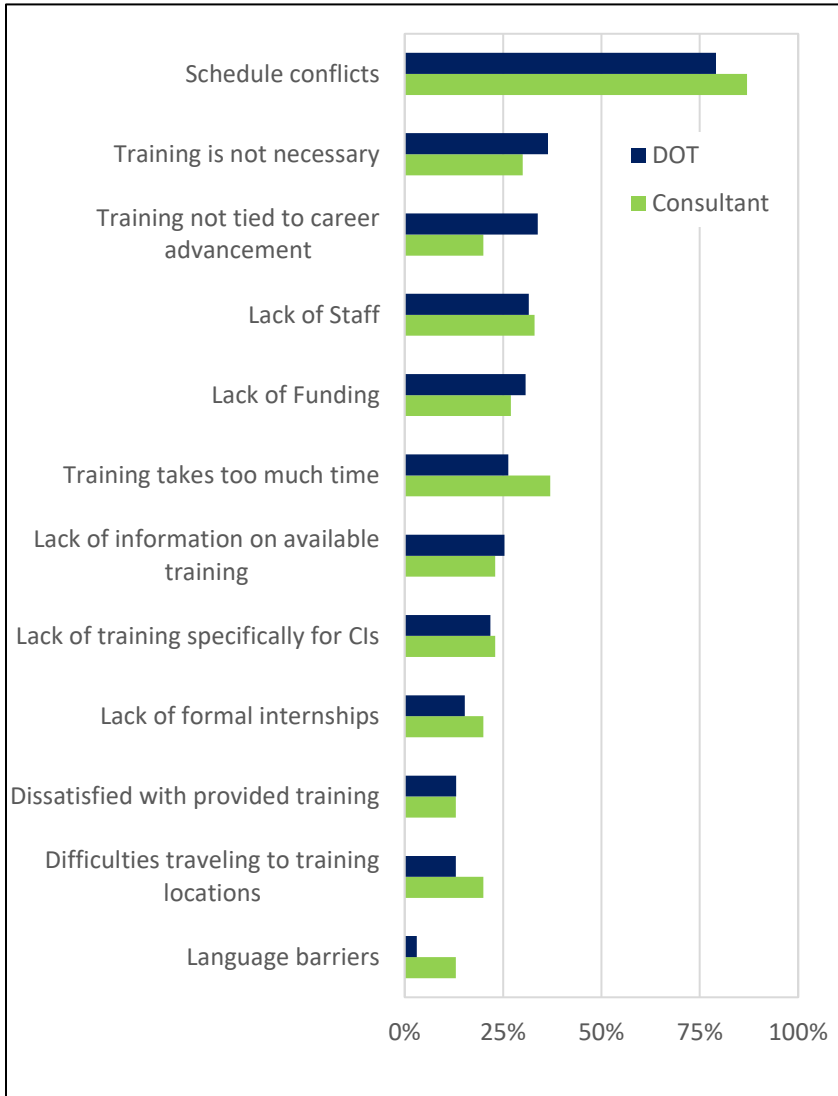
Data from DOT Survey

Training Method	Competency			
	Academic	Technical	Personal Effectiveness	Workplace
Instructor-led in-person training	✓✓	✓		✓
3 rd Party instructor-led in-person training	✓✓	✓		✓
Instructor-led online training	✓✓	✓		✓✓
3 rd Party instructor-led online training	✓✓	✓		✓✓
Instructor-led hands-on applications	✓✓	✓	✓	✓
OJT		✓	✓	✓
Mentoring		✓	✓	✓
Self-paced learning	✓✓	✓		✓✓

KEY:
 ✓ Recommended
 ✓✓ Highly recommended

Strategies to Address Training Barriers

Training barrier frequencies



Data from DOT and Consultant Surveys

Barrier	Description	Strategies
Scheduling conflicts	Unable to attend training due to travel and limited availability due to work responsibilities	Provide condensed, just-in-time training sessions at easily accessible locations and self-paced learning to reduce the time required to complete the training. Deliver instructor-led virtual training in the evenings and on weekends. Use downtimes and non-construction periods for training.
Lack of staff resources	Limited resources to develop and deliver training	Utilize self-paced learning. Use instructor-led virtual training that can be provided to many inspectors simultaneously with limited staff. Schedule annual boot camps when staff is available (e.g., non-construction season). Use retirees as SMEs to develop and deliver materials.
Lack of funding	Lack of funding to cover training costs for inspectors. Training budgets are less today than in the past.	Provide training online to reduce the costs and time to attend the training. Provide practical tools and materials for self-paced learning.
Lack of time to plan and organize training	Limited time available to organize and plan training programs and events	Provide condensed and self-paced training programs that reduce the time required to organize and plan the training. Use of boot camps that take place at the same time annually to reduce planning and organizing
Lack of accessible training locations	Lack of accessible and useful training centers and locations	Partner with local training centers and higher education programs. Use of instructor-led virtual training that is provided evenings and weekends. Use downtimes and non-construction periods for training requiring travel, and the DOT covers travel costs.
Low interest or enrollment	Very few inspectors show interest or enroll in training	Require training for inspectors rather than relying on them to attend. Provide incentives and clear progression possibilities to entice attending training that is not required. Clearly advertise and promote upcoming training options.
Lack of communicating training events	Information about available training is not communicated clearly to inspectors	Determine a schedule of training events and clearly communicate the plan to inspectors regularly and at least eight weeks before the scheduled training.
Low quality training	Training is not providing the benefits to inspectors due to lack of development, lack of materials, and lack of SMEs to deliver materials	Maintenance of the training program by reviewing training materials regularly and revising as needed. Use of performance measures to know if the training was effective or not.
Lack of incentive	Employees want to know, “what’s in it for me?” Lack of career paths and clear advancement means inspectors lose interest in attending training	Develop training programs that are tied to career paths and promotions so that inspectors are encouraged to attend training

Certification/ Qualification

- All DOTs require internal certifications
- External certifications and training organization are used by DOTs
- Certification requirements are the same for in-house and consultant inspectors

Certification/Qualification Organization	AASHTO Regions			
	Region 1	Region 2	Region 3	Region 4
American Concrete Institute (ACI)	✓✓	✓✓	✓✓	✓✓
American Concrete Pavement Association (ACPA)	--	✓	--	✓
American Traffic Safety Services Association (ATSSA)	✓✓	✓✓	✓	✓✓
Asphalt Institute (AI)	--	✓✓	--	X
Mid-Atlantic Region Technician Certification Program (MARTCP)	--	X	X	X
Multi-Regional Training and Certification Program (M-TRAC)	X	--	✓✓	--
National Asphalt Pavement Association (NAPA)	✓	✓	--	✓
National Center for Asphalt Technology (NCAT)	✓	✓	✓	✓
National Institute for Certification in Engineering Technologies (NICET)	✓✓	✓	✓	✓
Northeast Center of Excellence for Pavement Technology (NECEPT)	✓✓	X	X	X
Northeast Transportation Technician Certification Program (NETTCP)	✓	X	X	X
Occupational Safety and Health Administration (OSHA)	✓✓	✓	✓	✓✓
Precast/Prestressed Concrete Institute (PCI)	✓	✓✓	✓	✓
Western Alliance for Quality Transportation Construction (WAQTC)	X	X	X	✓
X	<i>Not used</i>			
--	<i>One or two DOTs accept this certification/qualification</i>			
✓	<i>Most DOTs accept this certification /qualification</i>			
✓✓	<i>All DOTs accept this certification/qualification</i>			

National, Regional, and State Certifications

- External organizations providing construction inspection certifications for DOTs
- Example: American Concrete Institute (ACI) is used by most DOTs

National

- External organizations providing construction inspection certifications to DOTs in a geographical region
- Examples: NETTCP and WAQTC

Regional

- Internal certifications that are required by the DOT.
- Most DOTs use internal certification processes rather than external organizations

Agency

Re-certification

- DOTs may require construction inspectors to be re-certified periodically to refresh existing knowledge, learn new information, and sharpen their skills.
- Strategies for re-certification
 - Conduct annual audits of the inspector's KSAs
 - Implement short or abbreviated course(s) and exam(s)
 - Use condensed training and examination based on performance
 - Discuss the potential for re-certification at larger intervals, such as every five years instead of every three years

Measuring DOT Training and Certification Programs

- Performance Indicators for construction inspector training and certification programs
 - Example targets provided
 - Adapt targets to match DOT operations

Key Performance Indicator	Description	Example Target
<i>Annual training completion rate</i>	Number or percent of inspectors that complete training programs annually	More than 67% of inspectors complete training in a year
<i>Annual certification passing rate</i>	Number or percent of inspectors passing certification exams annually	More than 80% of inspectors pass certification exams in a year
<i>Annual re-certification passing rate</i>	Number or percent of inspectors passing re-certification exams annually	More than 80% of inspectors pass the recertification exam in a year
<i>Quality training rate</i>	Likert-scale rating questions are provided as a survey at the end of training events to rate the quality and usefulness of the program.	At least 80% of end-of-training survey responses indicate quality training in useful information
<i>Effectiveness of Training</i>	Supervisors observe inspectors in the field after completing training and obtaining certifications to rate performance.	At least 80% of supervisors observe inspectors performing inspections adequately based on the training received.

Training Summary

- Develop a training plan that provides information on the source of training, the type of training, and the modality of how it will be presented and received. Utilize the training programs provided by DOTs and third-party organizations
- Create an individual training program for inspectors with the help of their supervisor based on their position level, experience, and proficiency in inspection competencies
- When staffing permits, less experienced inspectors can shadow experienced inspectors in the field, devote as much time as possible to guide the trainee, and develop specific KSAs that experienced inspectors can communicate and teach to trainee inspectors
- Promote career paths and development through coursework and other opportunities that allow inspectors to gain KSAs and progress toward higher-level positions
- Review and update training programs to align with evolving responsibilities of construction inspectors.
- Ensure that trainers are appropriately prepared and sufficiently skilled to provide training. Provide appropriate training when needed to the trainers (i.e., train the trainer courses)

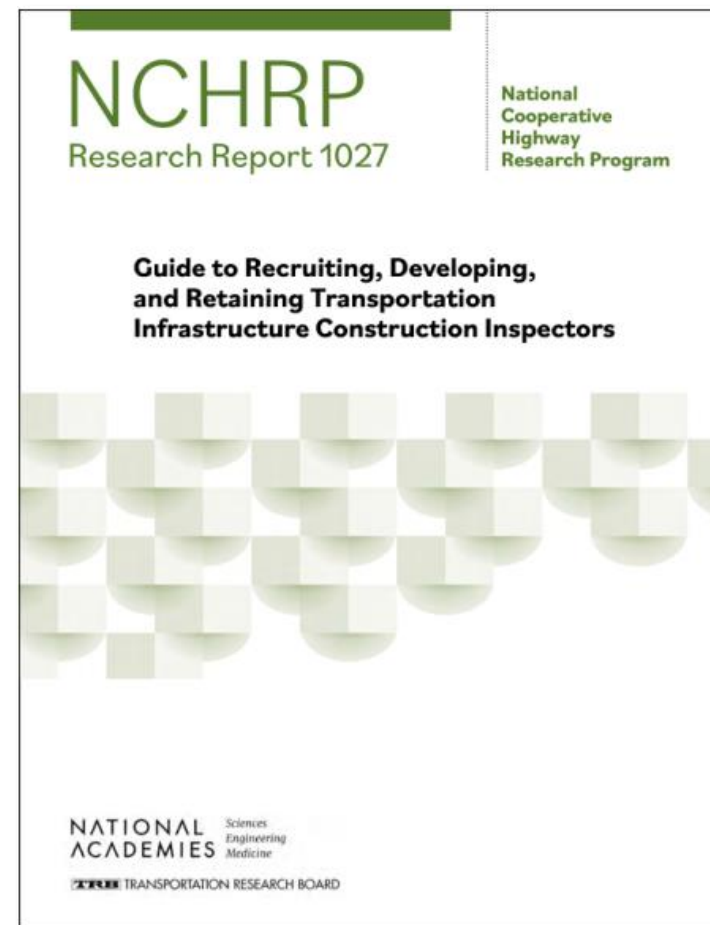
Certification Summary

- National, regional, and agency certifications exist for construction inspectors, and DOTs use internal, external, or a combination of certifications for inspectors.
- Select the certification programs most suitable for their construction inspection operations.
- Develop similar inspection and testing standards among DOTs, which helps third-party consultants to obtain certifications to work in multiple states.
- Consider streamlining the certification process to make it more efficient for its consultant partners
- Consider sharing inspectors internally across the DOT districts/regions.
- Re-certification programs can consider conducting annual audits of the inspector's KSAs, implementing short or abbreviated course(s) and exam(s), using condensed training and examination based on performance, and requiring re-certification at larger intervals.

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Q&A



NCHRP Report 1027: Guide to Recruiting, Developing, and Retaining Transportation Infrastructure Construction Inspectors

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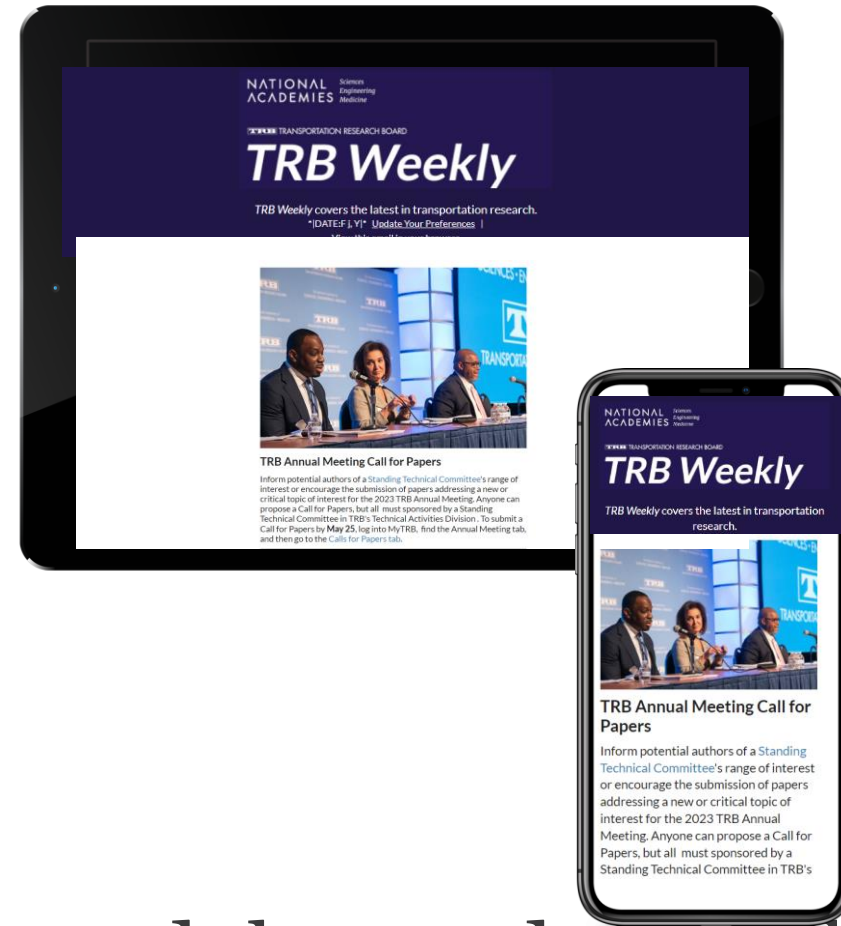
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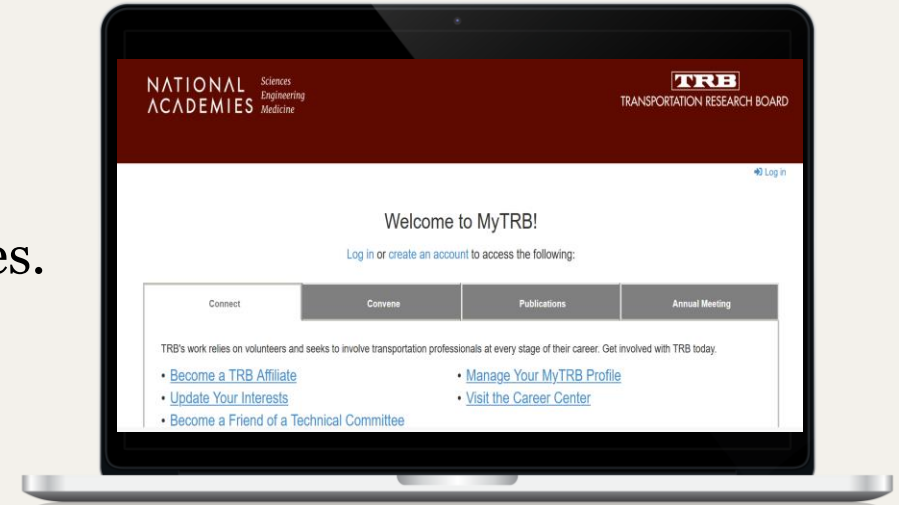


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