

NCHRP 25-25, Task 111

Environmental Management System Perspectives for State DOTs

<http://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=4335>

February 26, 2019

What We Will Cover Today

- ▶ Describe the 25-25 111 EMS Study
- ▶ Define EMS
- ▶ Present Findings and Applications
- ▶ Demonstrate the EMS Information Array
- ▶ Questions & Answers

NCHRP 25-25, Task 111 -Environmental Management System Perspectives for State DOTs

OBJECTIVE: The objective of this research is to provide practical examples of how transportation agencies created and are using EMS to address their operational issues and goals in the context of an ISO-compliant system.

Project Team

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Environmental Management System

Environmental Management System (EMS)

- ▶ Environmental / Regulatory / Stewardship

- ▶ Air
- ▶ Water
- ▶ Noise
- ▶ Ecology
- ▶ Cultural
- ▶ Waste



Environmental *Management* System (EMS)

E M S

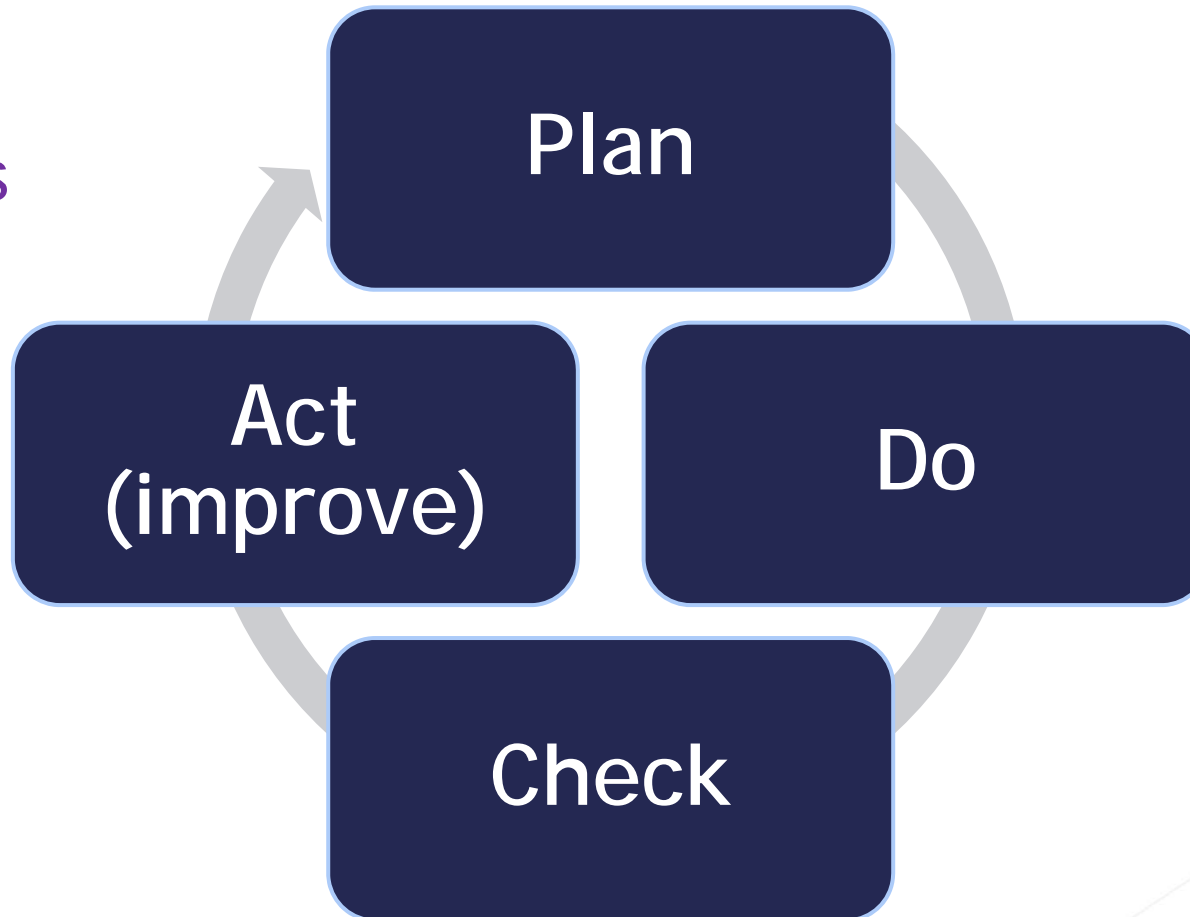
Management

Definition: the process of dealing with or controlling things or people

Synonyms: management, running, direction, control, governing, administration, supervision

Environmental Management System (EMS)

EMS



Systematic & Proactive

2

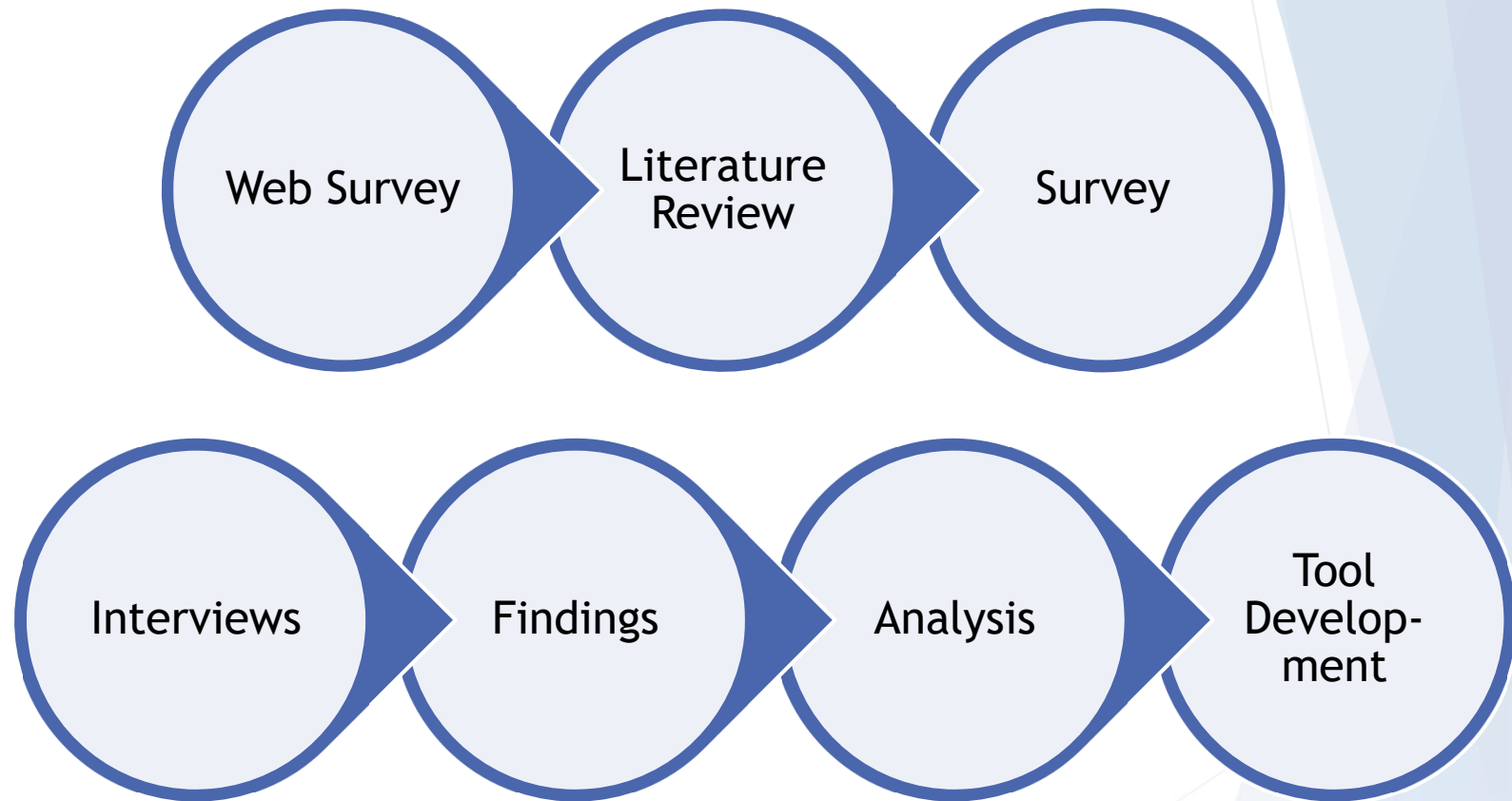
Study

Guided by PDCA



Plan	Written Procedures	Performance Targets	Integrated with Quality Assurance
Do	Training (all staff levels)	Record Keeping	Reporting
Check	Audit	Roll up to agency wide Compliance	
Act (improve)	Audit Follow up	Research	

Study Steps



3

DOTs & EMS - General Findings

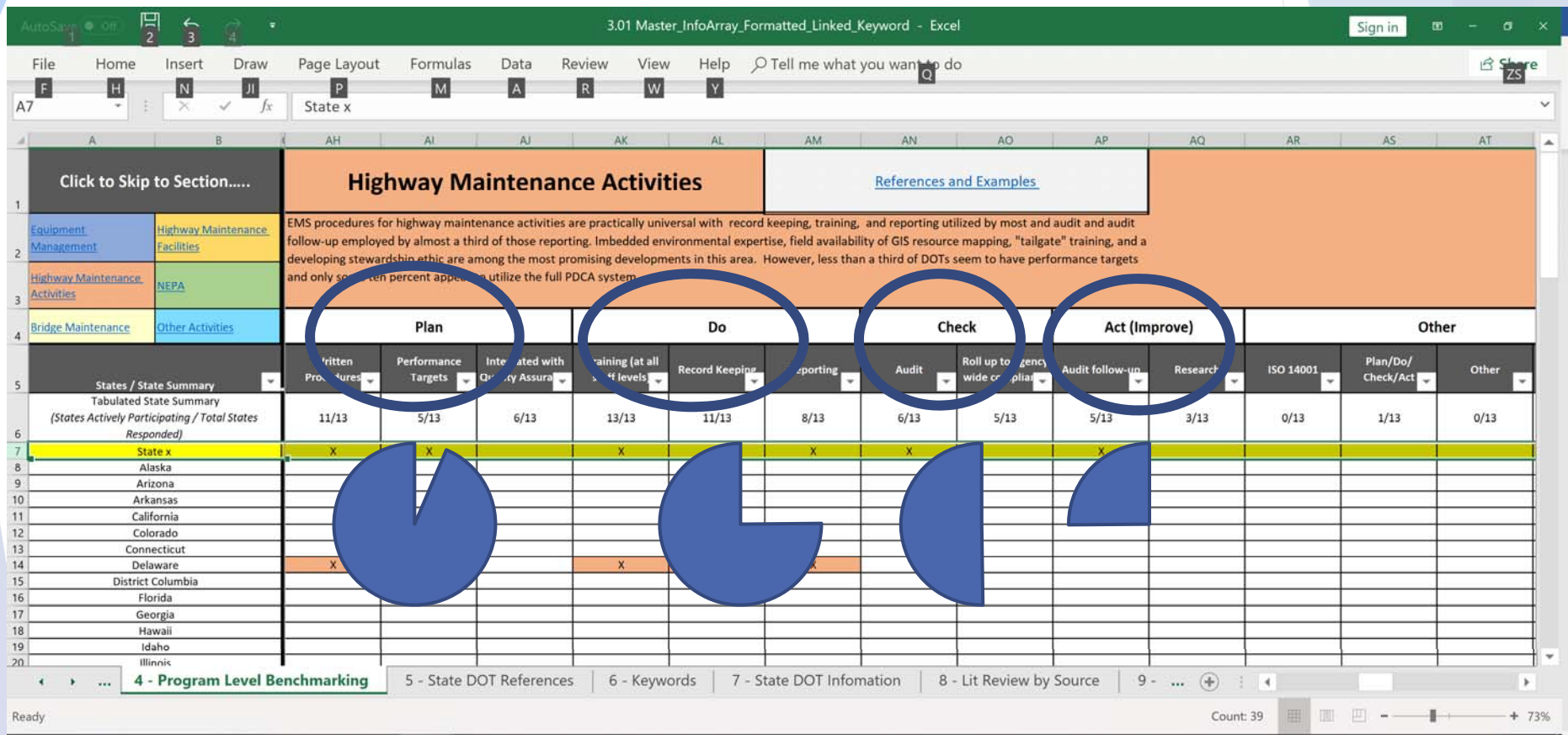
- ▶ EMS considered essential and cost effective
- ▶ EMS / (QA) is a standard business practice
- ▶ ISO 14001 certifications are rare
- ▶ Most DOTs have gaps in their PDCA cycle
- ▶ DOT units approach EMS independently
- ▶ EMS tends to be reactive in practice

Findings - EMS in Practice

- ▶ EMS can promote “Streamlining”
- ▶ Ownership fosters rigor
- ▶ Integration improves efficiency
- ▶ Staff training and engagement is common
- ▶ “Checking” and “Acting” tend to be done as time (and knowledge) permits

4

Analysis: EMS Practice by Program Area



4

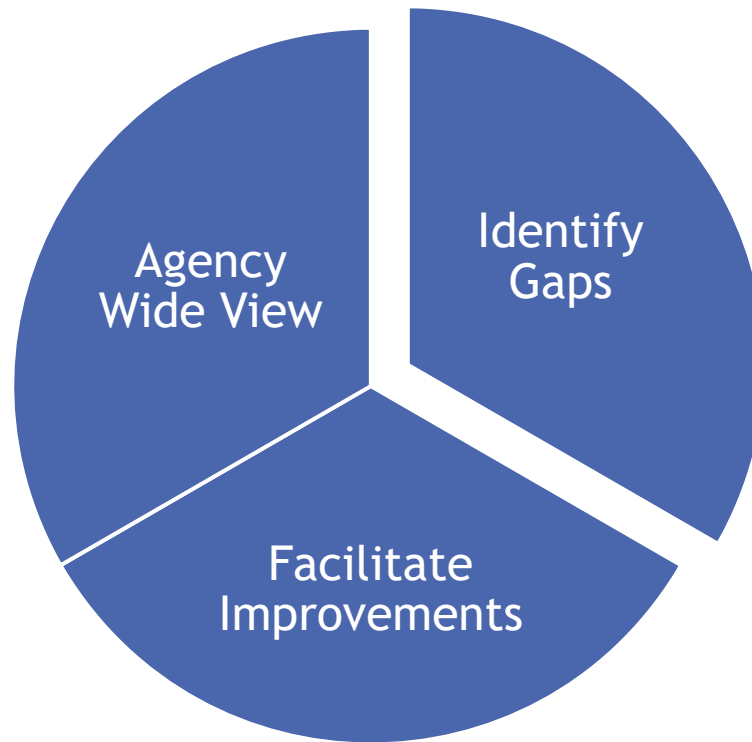
Tool Development: EMS Information Array

Need for EMS IA

- ▶ EMS benefits are being “left on the table”
- ▶ EMS assessment methods are lacking
- ▶ Proven EMS processes are unpublished
- ▶ Environmental Units may not understand Maintenance and Operational processes and needs

Information Array (IA)

Benchmarking tool



One Size Will Not Fit All

- ▶ Ownership is essential
- ▶ PDCA may be universal, but different institutional settings
 - ▶ Culture
 - ▶ Setting
 - ▶ Capacity
 - ▶ Leadership
- ▶ Planning ≠ Design ≠ Maintenance

DOT EMS IA - Layout

Tab 2: Instructions

NCHRP DOT Environmental Management System Information Array (DOT EMS IA)	
Background	
<p>For use by DOT Environmental Staff, Design Managers, Maintenance Engineers, Operation Managers, and Executive Staff to understand and access reference material on:</p> <ol style="list-style-type: none"> 1. What an EMS is, 2. How to successfully initiate / expand / benchmark an EMS, 3. How to improve EMS effectiveness using peer resources, and 4. How to quickly access EMS literature and survey data. <p>As used herein, an <u>Environmental Management System (EMS)</u> is defined as some systematic means of planning, executing, checking, revising, and improving environmental compliance and/or stewardship. In this light, even basic quality assurance procedures for avoidance of environmental violations are within the continuum of EMS applications.</p>	
Information Access / Benchmarking Instructions	
Practitioners may begin by reviewing the DOT EMS Prototype Benchmarking Tool at Tab 3: DOT EMS Agency Benchmarking Tool with their agency's Plan/Do/Check/Act procedures to gain an agency-wide perspective of EMS practice across all program areas.	DOT EMS Agency Benchmarking Tool Click here!
For more detailed analysis of agency EMS practices within each program area, Tab 4: Program Level Benchmarking. Tab 4 allows practitioners to compare their (or other) states survey data with commonly accepted Plan/Do/Check/Act conventions. The Benchmarking Look up Tool also allows the user to search and screen by topic and by state by clicking on the "arrow" icons of the various "column" tabulations.	Program Level Benchmarking Click here!
Further background, references, and examples from the survey may be found at Tab 5: State DOT References	State DOT References Click here!
Additional tabs contain suggested search terms (Tab 6: Keywords), literature summaries (Tabs 8-11: Literature Reviews), and links as specified. A webinar presentation, including an example application of this Information Array, may be opened by clicking on the link to the right.	EMS Webinar Link - Click here!
EMS IA Excel Tips and Tricks	
<ol style="list-style-type: none"> 1. The information in this Excel spreadsheet is presented in "read only" mode but may be downloaded and modified for local use. 2. The spreadsheet contains hyperlinks and an occasional "mouse-over" feature. Clicking on embedded links will take you to the associated webpage or location within a tab. "Mouse-over" comments will appear when your cursor selects the active cell. 3. Pressing "Control + F" activates a search function within the document. This can be used to search for a specific word or phrase. A listing of common search terms is available at Tab 6: Keywords. 4. Tabs at the bottom of the page access separate topics as labeled. The arrow keys to the left of the first tab can be right-clicked to view and select from available tabs. 5. For additional instructions on the use of Excel, please see the "Tell me what you want to do..." in the menu at the top of this page, or press "Alt+Q" and begin typing a question or keywords. 	

EMS IA - Instructions

For use by DOT Environmental Staff, Design Mangers, Maintenance Engineers, Operation Managers, and Executive Staff to understand and access reference material on:

1. What an EMS is
2. How to successfully initiate / expand / benchmark an EMS
3. How to improve EMS effectiveness using peer resources, and
4. How to quickly access EMS literature and survey data.

Begin with Tab 3 - Benchmarking

Tab 3: Prototype Benchmarking Tool

Benchmarking Tool		Plan			Do			Check		Act (Improve)	
Program Area	Special Features	Written Procedures	Performance Targets	Integrated with Quality Assurance	Training (of all staff levels)	Record Keeping	Reporting	Audit	Roll up to Agency Wide Compliance	Audit Follow-Up	Research
Equipment Management	Materials recycled, good housekeeping practiced.										
Highway Maintenance Facilities	Materials, fuels, stormwater, wastes under active management.										
Highway Maintenance Activities	Sensitive resources factored into planning, training, audit and support.										
NEPA	Commitments tracked through construction and maintenance.										
Bridge Maintenance	Sensitive resources, factored into planning, training, audit and support.										
Other Activities	Specialized support engaged.										

Tab 4: Program Level Benchmarking

Click to Skip to Section.....		Equipment Maintenance		References and Examples											Highway Maintenance Facilities					
Equipment Management	Highway Maintenance Facilities	Written procedures, record keeping, and training followed by audits are core EMS processes, so their predominance is indicative of a serious interest in EMS for equipment maintenance. However, less than half of the organizations responding have performance targets and less than a quarter report PDCA capabilities.														EMS procedures for highway maintenance facilities seem more the rule than the exception. Most facilities have record keeping, reporting, and training followed closely by audit and audit performance targets and less than a third utilize the full PDCA system.				
Highway Maintenance Activities	NEPA	Plan		Do			Check		Act (Improve)		Other				Plan		Do			
Bridge Maintenance	Other Activities	Written Procedures	Performance Targets	Integrated with Quality Assurance	Training (at all staff levels)	Record Keeping	Reporting	Audit	Roll up to agency wide compliance	Audit follow-up	Research	ISO 14001	Plan/Do/Check/Act	Other	Not Sure / No Answer	Written Procedures	Performance Targets	Integrated with Quality Assurance	Training (at all staff levels)	Record Keeping
States / State Summary		13/13	6/13	6/13	12/13	12/13	9/13	9/13	4/13	9/13	3/13	1/13	4/13	0/13	3/13	15/17	10/17	10/17	17/17	15/17
Tabulated State Summary (States Actively Participating / Total States Responded)		X			X	X	X	X		X						X			X	X
Alabama																				
Alaska																				
Arizona																				
Arkansas																				
California																				
Colorado																				
Connecticut																				
Delaware																				
District Columbia																X	X		X	X
Florida																				
Georgia																				
Hawaii																				
Idaho																				
Illinois																				
Indiana																				
Iowa																				
Kansas																				
Kentucky																				
Louisiana																				
Maine		X	X	X	X	X	X	X	X	X	X		X			X	X	X	X	X
Maryland				X												X	X	X	X	X
Massachusetts		X			X	X	X	X		X						X			X	X
Michigan																				
Minnesota		X		X	X	X										X		X	X	X
Mississippi		X			X	X	X	X		X					X	X	X	X	X	X
Missouri																				
Montana																				
Nebraska																				
Nevada		X	X		X	X	X				X		X			X	X	X	X	X
New Hampshire		X	X	X	X	X	X	X	X	X		X	X			X	X	X	X	X
New Jersey																				
New Mexico																				
New York																				
North Carolina		X		X	X	X									X				X	
North Dakota																				
Ohio																X			X	X

Filter for State Data

Highway Maintenance Activities

Click to Skip to Section.....

Equipment Maintenance [References and Examples](#)

Written procedures, record keeping, and training followed by audits are core EMS processes, so their predominance is indicative of a serious interest in EMS for equipment maintenance. However, less than half of the organizations responding have performance targets and less than a quarter report PDCA capabilities.

States / State Summary	Plan		Do		Check		Act (Improve)	
	Written Procedures	Performance Targets	Integrated with Quality Assurance	Training (at all staff levels)	Record Keeping	Reporting	Audit	Roll up to agency wide compliance
Tabulated State Summary (States Actively Participating / Total States Responded)	13/13	6/13	6/13	12/13	12/13			
Alabama	X			X	X			
Arizona								
Arkansas								
California								
Colorado								
Connecticut								
Delaware								
District Columbia								
Florida								
Georgia								
Hawaii								
Idaho								
Illinois								
Indiana								
Iowa								
Kansas								
Kentucky								
Louisiana								
Maine	X	X	X	X	X			
Maryland								
Massachusetts	X			X	X			
Michigan								
Minnesota	X		X	X	X			
Mississippi	X			X	X	X	X	
Missouri								
Montana								
Nebraska								
Nevada	X	X		X	X	X		X
New Hampshire	X	X	X	X	X	X	X	X
New Jersey								
New Mexico								
New York								
North Carolina	X		X	X	X			
North Dakota								
Ohio								

ReadMe | 1 - Title Page | 2 - Instructions | 3 - DOT EMS Agency Benchmarking | **4 - Program Level Benchmarking** | 5 - State DOT References | 6 - Keywords

Reporting Audit Roll up to agency wide compliance

Sort A to Z
Sort Z to A
Sort by Color
Clear Filter From "Roll up to agency..."
Filter by Color
Text Filters

Search

☒ (Select All)
☐ 4/13
☒ X
☐ (Blanks)

OK Cancel

Agency Benchmarking

4 - Program Level Benchmarking

5 - State DOT References

Tab 5: State DOT References

State DOT EMS Reference Materials						
	Topic	State DOT	Link	Date	Document	Keywords
84	EMS Equipment Management	New Hampshire	https://www.nh.gov/dot/crs/operations/highwaymaintenance/documents/EIP-2Form2aActivityRankings_042017.pdf	2017	Environmental Activity Inventory Significance Ranking	audit, record keeping, mainte
85	EMS Equipment Management	New Hampshire	https://www.nh.gov/dot/crs/operations/highwaymaintenance/documents/EIP-2Form2cActivityRankingCriteria050317.pdf	2015	Environmental Aspects Significance Ranking Criteria	audit, record keeping, checkli
86	EMS Equipment Management	New Hampshire	https://www.nh.gov/dot/crs/operations/highwaymaintenance/documents/EIP-3-Form3aGeneralLegalandOtherRequirements0114.pdf	2014	General Legal Requirements	storage, handling, salt, brine, v
87	EMS Equipment Management	New Hampshire	https://www.nh.gov/dot/crs/operations/highwaymaintenance/documents/EIP-3-Form3bEnvironmentalPermitsLicenses050317.pdf	2017	EMS Environmental Permits, Licenses, and Authorization Register	audit, record keeping, permit
88	EMS Equipment Management	New Hampshire	https://www.nh.gov/dot/crs/operations/highwaymaintenance/documents/EIP-6Form6aEnvironmentalOrganizationalChart7212016.pdf	2015	EMS Environmental Organization Chart	organization, responsibilities, r
89	EMS Equipment Management	New Hampshire	https://www.nh.gov/dot/crs/operations/highwaymaintenance/documents/EIP-8-	2017	Environmental Event Log	audit, record keeping
90	EMS Equipment Management	New Hampshire	https://www.nh.gov/dot/crs/operations/highwaymaintenance/documents/EMSGlossary021511.pdf	2011	EMS Glossary	highway maintenance, writen
91	EMS Equipment Management	Oregon	https://www.oregon.gov/ODOT/Maintenance/Documents/ems_manual.pdf	2012	Maintenance Yard EMS Policy and Procedures Manual	drums, highway maintenance,
92	EMS Equipment Management	Texas	https://www.txdot.gov/inside-tdot/division/environmental/compliance-toolkits/haz-mat.html		Hazardous Materials Toolkit Webpage	written procedures, hazardou
93	EMS Equipment Management	Ohio	Linked Documents\OHDOT D5 ECR Report 5-18.pdf	2018	Environmental Compliance Review, Product and Waste Management, includ	audit, environmental complian
94	EMS Equipment Management	Oregon	Linked Documents\ORDOT ems_user_guide.pdf	2013	ODOT Maintenance Materials Management Employee Handbook	EMS, written procedures, hig
95	EMS Equipment Management	PennDOT	PennDOT Fact Sheet Table of Contents 5-31-2018.xlsx	2018	Fact Sheet & Template Listing	record keeping, audit
96	EMS Equipment Management	PennDOT	PennDOT M-74.xlsx	2018	SEMP/EMS Internal Compliance Checklist for Maintenance	facility, highway maintenance
97	EMS Equipment Management	PennDOT	Linked Documents\PennDOT M-75.pdf	2016	Tank Monthly Inspection Checklist (AST and UST)	audit, record keeping
98	EMS Equipment Management	PennDOT	Linked Documents\PennDOT M-900 (1-13)-SEMP Checklist Template_protected.xlsx	2011	SEMP Environmental Checklist Record Sheet	audit, audit follow up, record k
99	EMS Equipment Management	PennDOT	PennDOT M-900.xlsx	2018	Facility Specific Environmental Inspection Checklist	audit, audit follow up, record k
100	EMS Equipment Management	PennDOT	PennDOT M-901 (1-13)-SEMP Checklist Record Sheet Template_protected.xlsx	2018	Facility Specific Environmental Inspection Checklist Record	audit, audit follow up, record k
101	EMS Equipment Management	PennDOT	PennDOT Records Summary - Residual Waste Management 2-1-18 rev0.pdf	2018	Residual Waste Management - Record Requirements	written procedures, facility, hig
102	EMS Equipment Management	PennDOT	PennDOT Universal Waste Lamps_Bulbs.pdf	2018	Fact Sheet Universal Waste Lamps / Bulbs	written procedures, facility, me
103	EMS General Practice					
104	EMS General Practice	Washington	http://www.wsdot.wa.gov/environment/technical/environmental-training		Environmental training webpage	construction site erosion, sedi
105	EMS General Practice	Wisconsin	https://wisconsin.gov/Pages/doing-business-with-us/consultants/csr/csr-sources/environment/formsandtools.aspx		Forms and Tools webpage	written procedures, cooperati
106	EMS General Practice	Arizona	https://www.azdot.gov/business/environmental-planning		Environmental Planning webpage	written procedures, categoric
107	EMS General Practice	MassDOT	https://www.mass.gov/massdot-highway-division-manuals-and-publications		Highway Division Manuals and Publications	written procedures, construct
108	EMS General Practice	Montana	https://www.mdt.mt.gov/publications/manuals.shtml		Manuals and Guides	written procedures, regulatory
109	EMS General Practice	New Hampshire	https://www.nh.gov/dot/crs/operations/highwaymaintenance/documents.htm		Highway Maintenance Library with EMS Links (bottom webpage)	written procedures, best pract
110	EMS General Practice	New Hampshire	https://www.nh.gov/dot/crs/operations/highwaymaintenance/documents/EIP-02_IdentifyingEnvironmentalAspectsImpacts10052017.pdf	2017	Identifying Environmental Aspects and Impacts	written procedures, regulatory
111	EMS General Practice	New Hampshire	https://www.nh.gov/dot/crs/operations/highwaymaintenance/documents/EIP-03_LegalandOtherRequirements10052017.pdf	2016	Legal and Other Requirements	regulatory, written procedures
112	EMS General Practice	New Hampshire	https://www.nh.gov/dot/crs/operations/highwaymaintenance/documents/EIP-04_SettingObjectivesandTargets10052017.pdf	2016	Setting Objectives and Targets	written procedures, stewardship
113	EMS General Practice	New Hampshire	https://www.nh.gov/dot/crs/operations/highwaymaintenance/documents/EIP-06_OrganizationPersonnelAccountabilityandResponsibility10052017.pdf	2017	Organization, Personnel, Accountability, and Responsibility	record keeping, audit, procedure
114	EMS General Practice	New Hampshire	https://www.nh.gov/dot/crs/operations/highwaymaintenance/documents/EIP-11_OperationalControls10052017.pdf	2015	Operational Controls	record keeping, audit, procedure
115	EMS General Practice	New Hampshire	https://www.nh.gov/dot/crs/operations/highwaymaintenance/documents/EIP-12_EmergencyPreparednessandResponse10052017.pdf	2017	Emergency Preparedness and Response	written procedures,
116	EMS General Practice	New Hampshire	https://www.nh.gov/dot/crs/operations/highwaymaintenance/documents/EIP-12-Form12aEmergencyPlansandPracticesMatrix032015.pdf	2015	Emergency Plans and Practices Matrix	written procedures, audit, che
117	EMS General Practice	New Hampshire	https://www.nh.gov/dot/crs/operations/highwaymaintenance/documents/EIP-13_NonconformityPreventativeandCorrectiveAction10052017.pdf	2017	Nonconformity, Preventive, and Corrective Action	written procedures
118	EMS General Practice	New Hampshire	https://www.nh.gov/dot/crs/operations/highwaymaintenance/documents/EIP-13-Form13bCorrectiveActionPlanandRootCauseAnalysisForm.pdf	2011	Corrective and Preventative Action Plan & Root Cause Analysis Form	audit, written procedures
119	EMS General Practice	New Hampshire	https://www.nh.gov/dot/crs/operations/highwaymaintenance/documents/EIP-14_EMSEvaluation10052017.pdf	2017	EMS Evaluation	audit, written procedures
			https://www.nh.gov/dot/crs/operations/highwaymaintenance/documents/EIP-14-			

4 - Program Level Benchmarking

5 - State DOT References

6 - Keywords

7 - State DOT Info

Tabs 6-11: EMS IA Further Information

NCHRP 25-25 Task 111 Information Array FINAL.xlsx - Excel

File Home Insert Page Layout Formulas Data Review View Developer BLUEBEAM Tell me what you want to do... Parker, Douglas Share

IF3 SPINOFF APPLICATIONS

Click to Skip to Section.....

This tab contains...
...the full survey record as compiled by the topics listed in the hyperlinks to the left. They may be accessed individually by the hyperlinks, or sequentially by scrolling to the right. State responses are by row and Row 6 drop-down "arrows" may be used to sort/filter.

[References and Examples](#)

SURVEY RESPONSE

GENERAL FRAMEWORK AND HISTORY

See the Final Report for additional background and detail. [HYPERLINK]

TOPIC

6a: Using the definition above, please indicate how your agency applies environmental measures

STATE	4: Agency name	5: Which of the following best describes your role?	Comprehensive written procedures	Integration with safety and other quality assurance concerns	Performance targets	Records keeping	Reporting	Periodic audits	Audit follow up
Alabama	ALDOT	DOT Environmental Director/Staff	Most	Most	At least one	Most	Most	At least one	At least one
Alabama	Alabama Department of Transportation	Other - Environmental Construction Engineer	Most	All	Most	All	Most	Most	Most
Alaska	Alaska DOT&PF	DOT Environmental Director/Staff							
Arizona	Arizona Department of Transportation	DOT Environmental Director/Staff	At least one unit	At least one	At least one	Most	Most	At least one	

5 - State DOT References 6 - Keywords 7 - State DOT Information 8 - Lit Review by Source 9 - Lit Review by Location 10 - Lit Review Prev Surveys 11 - Lit Review EMS History

7 - State DOT Information

8 - Lit Review by Source

9 - Lit Review by Location

10 - Lit Review Prev Surveys

11 - Lit Review EMS History

5

EMS IA Example

Tab 4: Benchmarking Lookup

Click to Skip to Section.....		Equipment Maintenance			References and Examples									
Equipment Management		Highway Maintenance Facilities			Written procedures, record keeping, and training followed by audits are core EMS processes, so their predominance is indicative of a serious interest in EMS for equipment maintenance. However, less than half of the organizations responding have performance targets and less than a quarter report PDCA capabilities.									
Highway Maintenance Activities		NEPA												
Bridge Maintenance		Other Activities												
		Plan			Do			Check		Act (Improve)		Other		
		Written Procedures	Performance Targets	Integrated with Quality Assurance	Training (at all staff levels)	Record Keeping	Reporting	Audit	Roll up to agency wide compliance	Audit follow-up	Research			
States / State Summary		13/13	6/13	6/13	12/13	12/13	9/13	9/13	4/13	9/13	3/13			
Alabama		X			X	X	X	X		X				
Alaska														
Arizona														
Arkansas														
YOUR DOT		X			X	X	X	X		X				
Maine			X	X	X	X	X	X	X	X				
Maryland				X										
Massachusetts					X	X	X	X		X				
Michigan														
Minnesota		X		X	X	X								
Mississippi		X			X	X	X	X		X		X		
Missouri														
Montana														
Nebraska														
Nevada		X	X		X	X	X				X	X		
New Hampshire		X	X	X	X	X	X	X	X	X		X		
New Jersey														
New Mexico														
New York														



Search using Tab 5: State DOT Reference

State DOT EMS Reference Materials

Topic	State DOT	Link
EMS Equipment Management	New Hampshire	https://www.nh.gov/dot/org/operations/highwaymaintenance/documents/EIP-2Form2bActivityRankings_042017.pdf
EMS Equipment Management	New Hampshire	https://www.nh.gov/dot/org/operations/highwaymaintenance/documents/EIP-2Form2cActivityRankingCriteria050317.pdf
EMS Equipment Management	New Hampshire	https://www.nh.gov/dot/org/operations/highwaymaintenance/documents/EIP-3-Form3aGeneralLegalandOtherRequirements0114.pdf
EMS Equipment Management	New Hampshire	https://www.nh.gov/dot/org/operations/highwaymaintenance/documents/EIP-3-Form3bEnvironmentalPermitsLicenses050317.pdf
EMS Equipment Management	New Hampshire	https://www.nh.gov/dot/org/operations/highwaymaintenance/documents/EIP-6Form6aEnvironmentalOrganizationalChart7212016.pdf
EMS Equipment Management	New Hampshire	https://www.nh.gov/dot/org/operations/highwaymaintenance/documents/EIP-8-Form8aEnvironmentalOrganizationalChart7212016.pdf
EMS Equipment Management	New Hampshire	https://www.nh.gov/dot/org/operations/highwaymaintenance/documents/EIP-8-Form8bEnvironmentalOrganizationalChart7212016.pdf
EMS Equipment Management	Oregon	https://www.oregon.gov/ODOT/Maintenance/Documents/ems_manual.pdf
EMS Equipment Management	Texas	https://www.txdot.gov/inside-txdot/division/environmental/compliance-toolkits/haz-mat.html
EMS Equipment Management	Ohio	https://www.ohio.gov/dot/documents/ODOT%205%20ECR%20Report%205-18.pdf
EMS Equipment Management	Oregon	https://www.oregon.gov/ODOT/ems_user_guide.pdf
EMS Equipment Management	PennDOT	https://www.penn.gov/dot/documents/PennDOT%20Fact%20Sheet%20Table%20of%20Contents%205-18.pdf
EMS Equipment Management	PennDOT	https://www.penn.gov/dot/documents/PennDOT%20M-74.xlsx
EMS Equipment Management	PennDOT	https://www.penn.gov/dot/documents/PennDOT%20M-75.pdf
EMS Equipment Management	PennDOT	https://www.penn.gov/dot/documents/PennDOT%20M-900%20II-131-SEMP%20Checklist%20Record%20Template%20protected.xlsx
EMS Equipment Management	PennDOT	https://www.penn.gov/dot/documents/PennDOT%20M-900.xlsx
EMS Equipment Management	PennDOT	https://www.penn.gov/dot/documents/PennDOT%20M-901%20II-131-SEMP%20Checklist%20Record%20Template%20protected.xlsx
EMS Equipment Management	PennDOT	https://www.penn.gov/dot/documents/PennDOT%20Records%20Summary%20Residual%20Waste%20Management%202-1-18%20rev0.pdf
EMS Equipment Management	PennDOT	https://www.penn.gov/dot/documents/PennDOT%20Universal%20Waste%20Lamps%20Bulbs.pdf
EMS General Practice	Washington	http://www.wsdot.wa.gov/environment/technical-services/environmental-training/
EMS General Practice	Wisconsin	https://www.wisconsin.gov/Pages/doina-bus-transportation-services/environmental-forms-and-tools.aspx
EMS General Practice	Arizona	https://www.azdot.gov/business/environmental-services/environmental-forms-and-tools.aspx
EMS General Practice	MassDOT	https://www.mass.gov/massdot-highway-divisions/transportation-services/environmental-forms-and-tools.aspx
EMS General Practice	Montana	https://www.mdt.mt.gov/publications/maintenance-manual/
EMS General Practice	New Hampshire	https://www.nh.gov/dot/org/operations/highwaymaintenance/documents.htm
EMS General Practice	New Hampshire	https://www.nh.gov/dot/org/operations/highwaymaintenance/documents/EIP-02_IdentifyingEnvironmentalAspectsImpacts-10052017.pdf
EMS General Practice	New Hampshire	https://www.nh.gov/dot/org/operations/highwaymaintenance/documents/EIP-03_LegalandOtherRequirements-10052017.pdf
EMS General Practice	New Hampshire	https://www.nh.gov/dot/org/operations/highwaymaintenance/documents/EIP-04_SettingObjectivesandTargets-10052017.pdf
EMS General Practice	New Hampshire	https://www.nh.gov/dot/org/operations/highwaymaintenance/documents/EIP-06_OrganizationPersonnelAccountabilityandResponsibility-10052017.pdf
EMS General Practice	New Hampshire	https://www.nh.gov/dot/org/operations/highwaymaintenance/documents/EIP-11_OperationalControls-10052017.pdf
EMS General Practice	New Hampshire	https://www.nh.gov/dot/org/operations/highwaymaintenance/documents/EIP-12_EmergencyPreparednessandResponse-10052017.pdf
EMS General Practice	New Hampshire	https://www.nh.gov/dot/org/operations/highwaymaintenance/documents/EIP-12-Form12aEmergencyPlansandPracticesMatrix032015.pdf
EMS General Practice	New Hampshire	https://www.nh.gov/dot/org/operations/highwaymaintenance/documents/EIP-13_NonconformityPreventativeandCorrectiveAction-10052017.pdf
EMS General Practice	New Hampshire	https://www.nh.gov/dot/org/operations/highwaymaintenance/documents/EIP-13-Form13bCorrectiveActionPlanandRootCauseAnalysisForm.pdf
EMS General Practice	New Hampshire	https://www.nh.gov/dot/org/operations/highwaymaintenance/documents/EIP-14_EMSEvaluation-10052017.pdf
EMS General Practice	New Hampshire	https://www.nh.gov/dot/org/operations/highwaymaintenance/documents/EIP-14-Form14aEMSPlanandPracticesMatrix032015.pdf

Control F to Search

Find and Replace

Find what: drums

Find All Find Next Close

8 cell(s) found

Sheet	Name	Cell	Value
5 - State DOT References	SG582	audit, record keeping, checklist,	
5 - State DOT References	SG591	drums, highway maintenance, w	
5 - State DOT References	SG5127	drums, highway maintenance, w	
5 - State DOT References	SG5158	audit, record keeping, checklist,	
5 - State DOT References	SG5173	stewardship, good housekeepin	
5 - State DOT References	SG5186	audit, record keeping, checklist,	
5 - State DOT References	SG5196	drums, highway maintenance, w	
5 - State DOT References	SG5197	drums, highway maintenance, w	

hire	https://www.nh.gov/dot/org/operations/highwaymaintenance/documents/EMSGloss	2011	EMS Glossary
	https://www.oregon.gov/ODOT/Maintenance/Documents/ems_manual.pdf	2012	Maintenance Yard EMS Policy and Procedures Manual
	https://www.txdot.gov/inside-txdot/division/environmental/compliance-toolkits/haz-		Hazardous Materials Toolkit Webpage

Reference Found

https://www.oregon.gov/ODOT/Maintenance/Documents/ems_manual.pdf

2012

Maintenance Yard EMS Policy and Procedures Manual

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1.4 EMPTY CONTAINERS

- Empty drums should be stored in a manner that indicates the drum is empty. Examples of ways to show the drum is empty include storing the drum sideways with the bungs horizontal, labeling the drum "empty," or keeping the drum in an area signed "empty drums" or similar wording. Refrain from storing drums that previously contained liquids upside-down.

Figure 1-1: Examples of ways to store a drum that indicate the drum is empty.



- If an **empty container** will be reused, the original label should be removed. The container should be relabeled with the intended contents, such as "trash" or "metal parts."
- Empty drums should be returned to the vendor for reconditioning, where available.
- Where available, recycling is recommended for **empty containers** that are not reused or returned to the vendor (e.g. recycling unwanted metal drums and cans as scrap metal).. Contact local recyclers for availability and requirements.
- Empty containers** that are not recycled, reused, or returned to the vendor should be managed as **solid waste** (i.e. trash). A list of permitted municipal landfills and transfer stations is located in Appendix J. Plastic drums should be cut into two separate pieces prior to disposal. Contact the local landfill for specific requirements.

1.4 EMPTY CONTAINERS..... 5

Summary

- ▶ 25-25 111 EMS Study available
- ▶ EMS benefits not fully realized
- ▶ EMS Information Array can help DOT's "Step up their game"

<http://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=4335>

*For more information on NCHRP 25-25/Task 111
(Including the Final Report):*

<http://apps.trb.org/cmsfeed/TRBNetProjectDisplay.asp?ProjectID=4335>

Or search: NCHRP 25 25 EMS

Or visit: AASHTO - CEE - EMS

For technical questions on the data or variables, contact:

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518.368.8374

Additional implementation assistance may be also available from:

<http://www.trb.org/NCHRP/NCHRPImplementationSupportProgram.aspx>



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Questions / Comments