Clark Dietz

Engineering Quality of Life®

Streamlining Road Maintenance:

A New Operating Procedures Manual for Berrien County

4/22/25

Introductions

Kevin Stack, PE

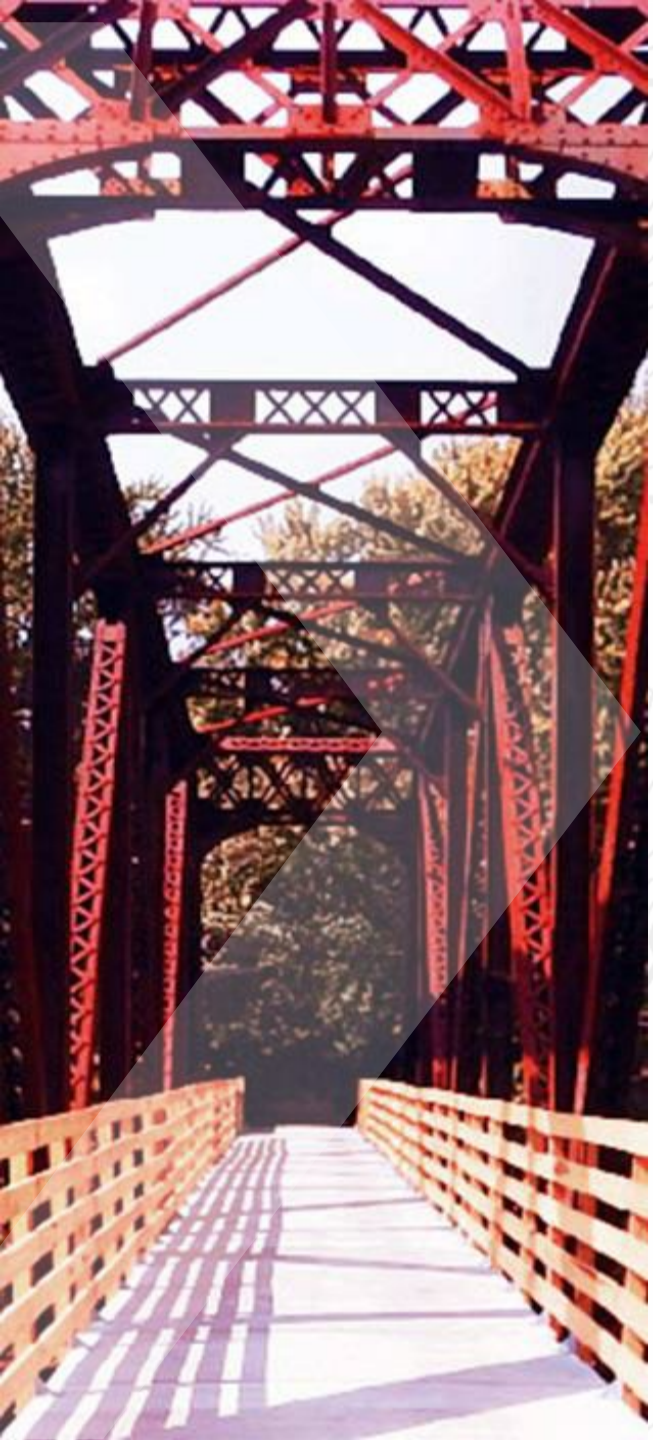
Engineering Supervisor

Drew Storey, CSSBB

Client Relations Director

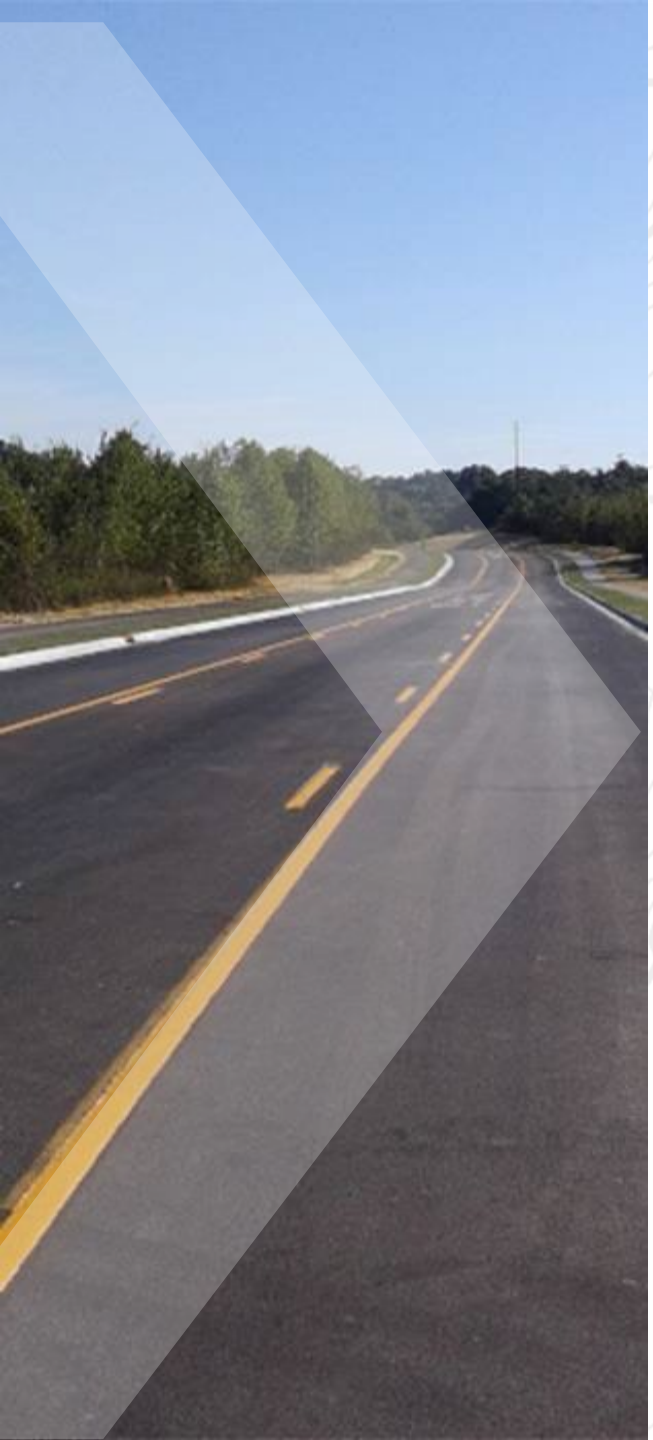
BERRIEN COUNTY
ROAD DEPARTMENT

ClarkDietz



Why This Project?

- 2022 employee fatality highlighted gaps in field procedures.
- MIOSHA's request for formal SOPs prompted broader review.
- Inconsistencies in field-level practices across garages.
- Need for consistent training and documentation.
- Desire to preserve institutional knowledge.



Common Challenges for County Highways

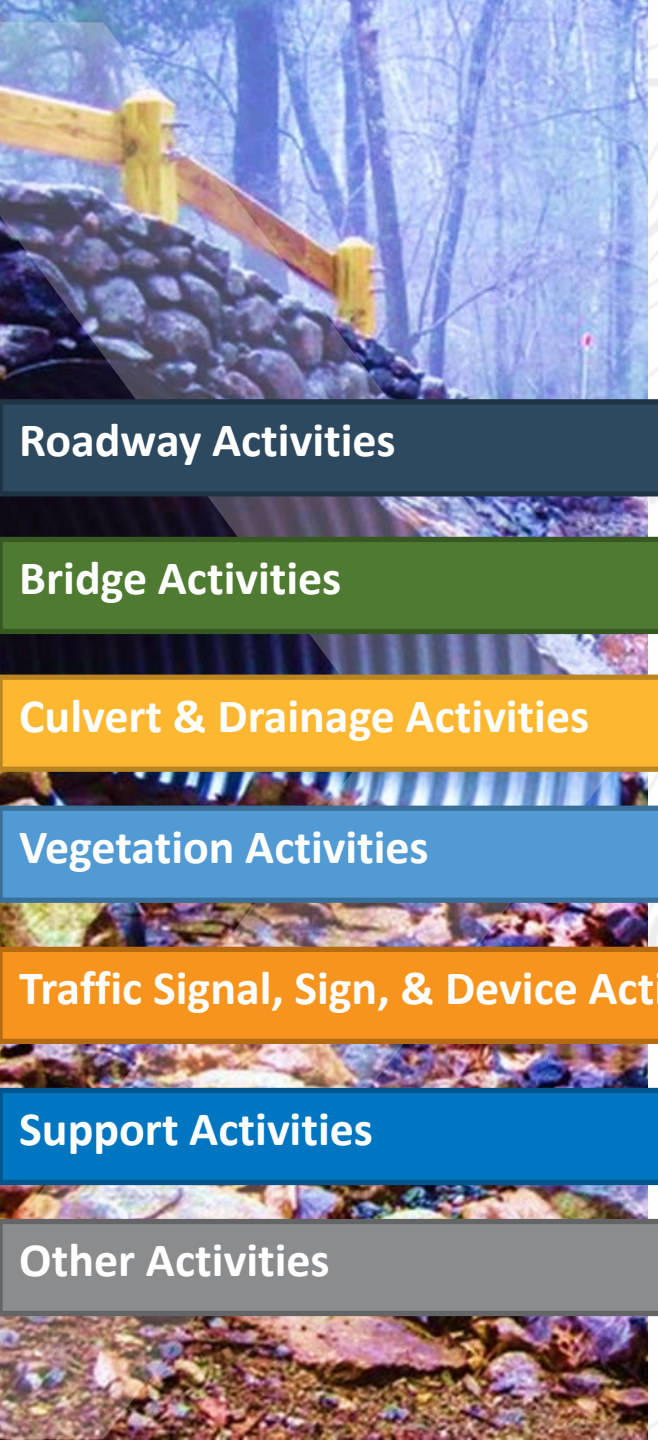
- Supervisors and garages operating with different practices.
  - Inconsistency in standards
  - Segmented knowledge base
- New employees lack formal onboarding tools.
- Difficult to justify resource requests without data.
- No clear benchmarks for anticipated daily output.
- Institutional knowledge **lost** to retirements.

Purpose of the Manual

- Clarify not just **how**, but **why** each task is performed.
- Establish consistent practices across all crews.
- Provide planning tools:
  - Scheduling requirements and considerations
  - Crew size and equipment need
  - Necessary materials
  - Average daily production (ADP).
- Support field-level supervision and training.
- Basis for accurate data collection and QA/QC program
- Flexible structure for real-world application.

How We Developed It

- Joint effort between BCRD and Clark Dietz from the outset.
- Included structured feedback from supervisors and crew.
- Reviewed and revised multiple draft iterations.
- Focused on field usability and buy-in throughout.
- Intended to be a **tool**, not a library book.



What's Covered: Activity Categories

Work Activities are grouped into the following Categories:

- **Roadway Activities:** Includes all maintenance of pavement and shoulders.
- **Bridge Activities:** Encompass inspections, minor repairs, and cleaning operations to prolong bridge life.
- **Culvert & Drainage Activities:** Involve clearing, repair, and maintenance to prevent water buildup and ensure road safety.
- **Vegetation Activities:** Focuses on landscaping, tree trimming, and brush control to ensure visibility and safety.
- **Traffic Signal, Sign, & Device Activities:** Covers installation, repair, and maintenance of traffic management devices to ensure compliance and safety.
- **Support Activities:** Providing support like traffic control for other groups.
- **Other Activities:** Include emergency response activities related to snow and other storm cleanup.

What's Covered: Activities

Roadway Activities
- Graveling & Blading Roads
- Grind and Graveling Roads
- High Shoulder Removal
- Pothole Patching
- Shoulder Repair
- Crack Sealing
- Dust Control
- HMA Blade Patching
- Sweeping
- Sealcoating
- Prime & Double Seal

Support Activities
- Traffic Control Operations

Bridge Activities
- Bridge Deck Cleaning
- Bridge Deck Patching
- Bridge Deck Sealing
- Bridge Joint Repairs

Traffic Signal, Sign, & Device Activities
- Guardrail Replacement
- Sign Replacement
- Signal Maintenance PM
- Signal Maintenance Response

Other Activities
- Snow and Ice Control
- Storm Cleanup

Culvert & Drainage Activities
- Catch Basin Repair and Construct
- Culvert Replacement
- Ditching and Ditch Cleanout
- Drainage Maintenance (culverts)
- Storm Sewer Clean out

Vegetation Activities
- Roadside mowing
- Tree Trimming and Removal
- Brush Removal
- Herbicide Treatment
- Soil Erosion Sediment Control

Inside the Manual: Structure and Components

MAINTENANCE PERFORMANCE STANDARDS MANUAL

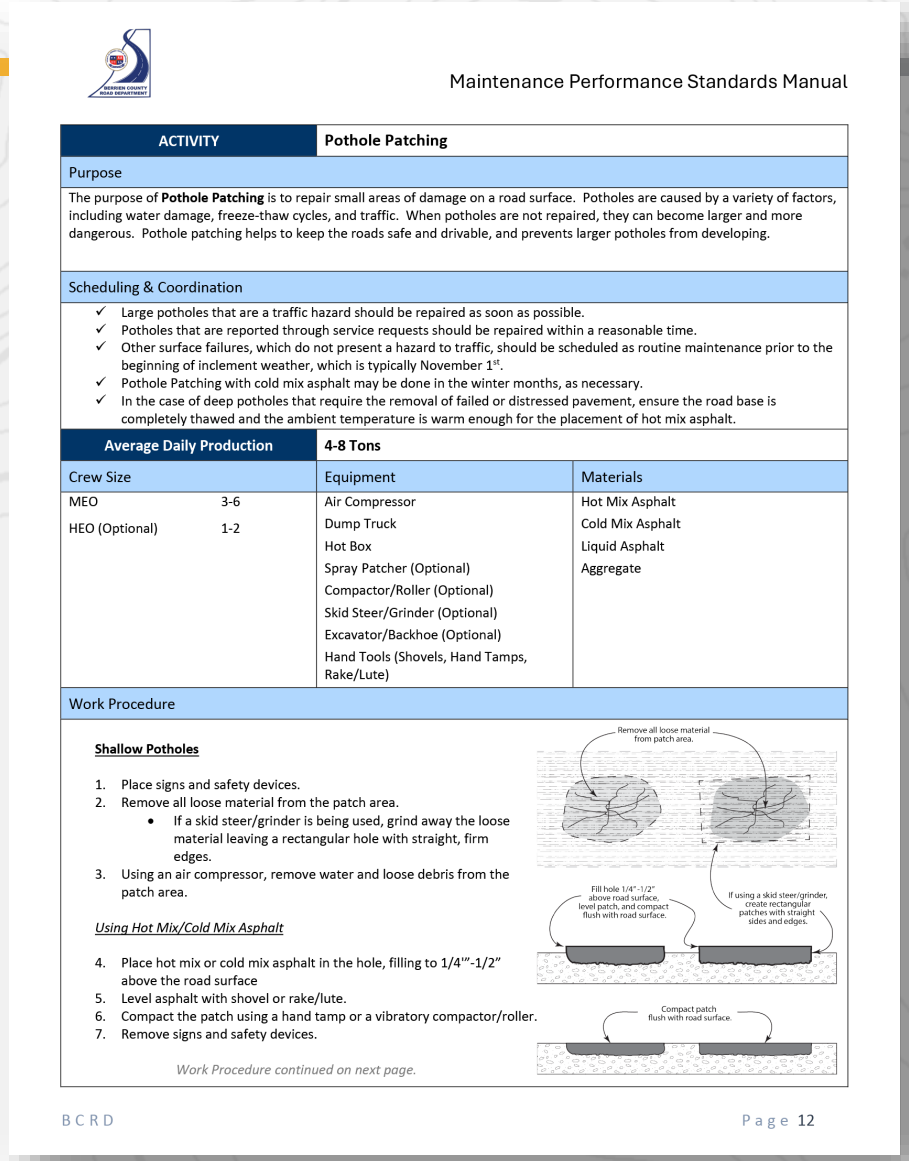
2025

BERRIEN COUNTY ROAD DEPARTMENT

Contents

Performance Standard Format

- Purpose
- Scheduling & Coordination
- Average Daily Production
- Resource Allocation (Crew Size, Equipment, Materials)
- Work Procedures



Maintenance Performance Standards Manual

ACTIVITY	Pothole Patching

Purpose

The purpose of **Pothole Patching** is to repair small areas of damage on a road surface. Potholes are caused by a variety of factors, including water damage, freeze-thaw cycles, and traffic. When potholes are not repaired, they can become larger and more dangerous. Pothole patching helps to keep the roads safe and drivable, and prevents larger potholes from developing.

Scheduling & Coordination

- ✓ Large potholes that are a traffic hazard should be repaired as soon as possible.
- ✓ Potholes that are reported through service requests should be repaired within a reasonable time.
- ✓ Other surface failures, which do not present a hazard to traffic, should be scheduled as routine maintenance prior to the beginning of inclement weather, which is typically November 1st.
- ✓ Pothole Patching with cold mix asphalt may be done in the winter months, as necessary.
- ✓ In the case of deep potholes that require the removal of failed or distressed pavement, ensure the road base is completely thawed and the ambient temperature is warm enough for the placement of hot mix asphalt.

Average Daily Production	4-8 Tons

Crew Size		Equipment	Materials
MEO	3-6	Air Compressor	Hot Mix Asphalt
HEO (Optional)	1-2	Dump Truck	Cold Mix Asphalt
		Hot Box	Liquid Asphalt
		Spray Patcher (Optional)	Aggregate
		Compactor/Roller (Optional)	
		Skid Steer/Grinder (Optional)	
		Excavator/Backhoe (Optional)	
		Hand Tools (Shovels, Hand Tamps, Rake/Lute)	

Work Procedure

Shallow Potholes

1. Place signs and safety devices.
2. Remove all loose material from the patch area.
   - If a skid steer/grinder is being used, grind away the loose material leaving a rectangular hole with straight, firm edges.
3. Using an air compressor, remove water and loose debris from the patch area.

Using Hot Mix/Cold Mix Asphalt

4. Place hot mix or cold mix asphalt in the hole, filling to 1/4'"-1/2" above the road surface
5. Level asphalt with shovel or rake/lute.
6. Compact the patch using a hand tamp or a vibratory compactor/roller.
7. Remove signs and safety devices.

Work Procedure continued on next page.

Performance Standard Format - Purpose

Purpose
The purpose of **Bridge Deck Cleaning** is to delay bridge structure deterioration and corrosion, preserve bridge components susceptible to the elements, maintain adequate deck drainage, and prolong the performance of the structure. Cleaning of bridge deck surfaces, expansion joints, drains, and sidewalks is accomplished by sweeping, vacuuming, hand shoveling, and air blasting to remove accumulation of sand, chemicals, and debris.

- Outlines “the why?”
  - This section explains the intent behind performing the work.

Performance Standard Format – Scheduling and Coordination

- Provides guidance on:
  - When to schedule the work
  - Work that may need to be performed in conjunction
  - Other scheduling considerations

Scheduling & Coordination
✓ This activity should be performed in the Spring, following snow and ice control operations, to remove the buildup of chlorides and sand/abrasives that accumulate during the winter season. ✓ Schedule this activity in advance to *Bridge Deck Sealing* to ensure a clean deck surface for the sealing activity. ✓ May be performed in advance of bridge inspections in order to ensure visibility of bridge components for proper inspection. ✓ Some structures may exhibit debris accumulation during harvest season. ✓ A list of structures to be cleaned should be provided by the resident Bridge Engineer or Bridge Inspection reports. ✓ Identify approved location for disposal of waste material in advance of scheduling.

Performance Standard Format - Average Daily Production

Average Daily Production	10 Bridges

- Average daily production rates (ADP) are a measure of how much work a crew can **reasonably** complete in a day (can be highly variable depending upon activity, location, etc.).
- ADP
  - Helps supervisors plan resources, and to track progress.
  - Provides a consistent unit of measure for the daily accomplishment of the activity being performed (ex. Bridges, Square Feet, Miles, etc.).
  - Is a key element to establishing baseline data for budgeting, scheduling, performance tracking, etc.

Performance Standard Format - Resource Allocation

- What resources will be needed to do the job?
  - Crew size, equipment, and materials needed for a typical job.
  - These can be highly variable, based on work site and situation, but represent a “typical” job.

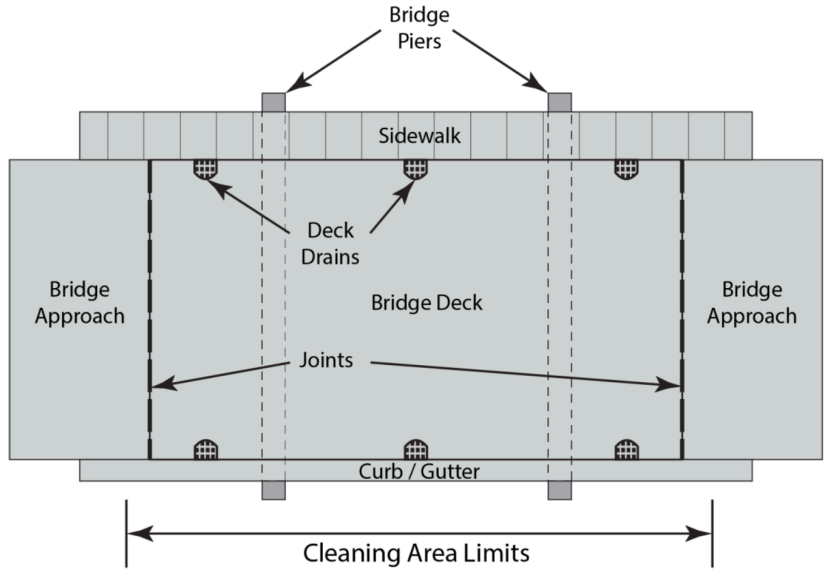
Crew Size		Equipment	Materials
MEO	4-6	Dump Truck	Water (Optional)
HEO (Optional)	1	Sweeper Truck or Broom	
		Air Compressor	
		Water Tank (Optional)	

Performance Standard Format – Work Procedure

- The work procedure is a step-by-step guide to performing the activity.
  - Includes diagrams where applicable.
  - Alternative methods that might be preferable based on infrastructure or equipment variability.

Work Procedure

1. Place signs and safety devices.
2. Use a Sweeper/Broom/Vacuum Truck to clean bridge deck surfaces.
3. Use hand tools to loosen debris from joints, drains, gutter lines, sidewalks, and other areas where dirt or debris has collected.
4. Blow out joints and drains where debris has collected.
5. Sweep or vacuum materials to be removed.
6. Flush deck, drains, and joints with water to clear any remaining debris (optional).
7. Load materials onto dump truck for disposal.
8. Remove signs and safety devices.
9. Dump waste materials at a designated dump location only.
   - It is **not recommended** to dispose of materials on site, as conservation regulations typically regulate the disposal of roadside materials.



Example Activity (Crack Sealing)

ACTIVITY	Crack Sealing

Purpose

The purpose of **Crack Sealing** is to prevent water, small stones, and other debris from entering the cracks in a road surface. Over time, cracks can widen and deepen due to freezing and thawing or expansion and contraction, which can lead to potholes and other subsurface roadway failures. Crack sealing helps to keep water and other debris from entering the pavement, preventing the cracks from getting worse, and extend the life of the road surface.

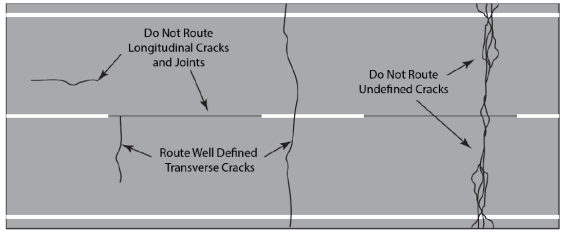
Scheduling & Coordination

- ✓ Work should be scheduled during months where the temperature is greater than 40°F due to temperature limitations of with the sealant material.
- ✓ If routing is needed, work should be scheduled during the spring months and fall months, so cracks are at the mid-point of the expansion/contraction cycle.
- ✓ Coordinate with Pavement Marking Maintenance if a significant amount of the pavement markings will be covered.

Average Daily Production	2-3 Center Line Miles	
Crew Size	Equipment	Materials
MEO 6-8	Air Compressor	Hot Pour Asphalt Sealant
HEO (Optional) 1-2	Sealant Applicator/Tar Kettle	Soapy Water or Anti-tracking Agent (Optional)
	Dump Truck	
	Hand Squeegees (U-shaped)	
	Pavement Router (Optional)	
	Hot Air Lance (Optional)	*Consult Management for material selection
	Water Tank (Optional)	

Work Procedure

1. Place signs and safety devices.
2. If routing is required, use a pavement router and rout all single, transverse cracks.
   - The reservoir created by the router should be square with dimensions of ¾ " x ¾ ".
   - If the crack is only partially across the traffic lane, continue routing across the entire lane width and paved shoulder (if applicable).
   - Longitudinal joints and cracks need not be routed.



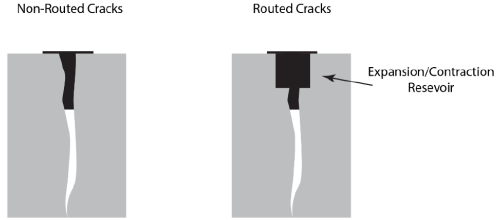
Work Procedure continued on next page.

Work Procedure (continued)

3. To ensure proper adhesion of the asphalt sealant material, cracks should be clean and dry. Use an air compressor, or hot air lance (Optional), to clean the cracks, removing all debris and moisture.

Note: *If sealing cracks on asphalt overlayed bridge decks, extreme caution should be used when preparing cracks. A membrane between the asphalt and underlying concrete likely exists, and any damage to this membrane can accelerate deterioration of the bridge deck.*

4. Cracks should be filled from the bottom up, to prevent the formation of air bubbles in the seal. The sealant should be flush with the pavement surface.
   - Avoid overfilling the cracks with excess material that will leave an unsmooth finish, and provide more opportunity for vehicle tracking and peeling from snowplows.
   - If over-banding, squeegee material with a narrow (U-shaped) squeegee. Limit over-band to less than 4 inches total width.



5. Lightly spray the sealant with soapy water, or an antitracking agent, to prevent tracking from vehicle tires while sealant cures. (Optional)
6. Remove signs and safety devices.

Approved By	Signature Name *Signature Title*	Effective Date	1/1/2025

Work Procedure

Service Lev

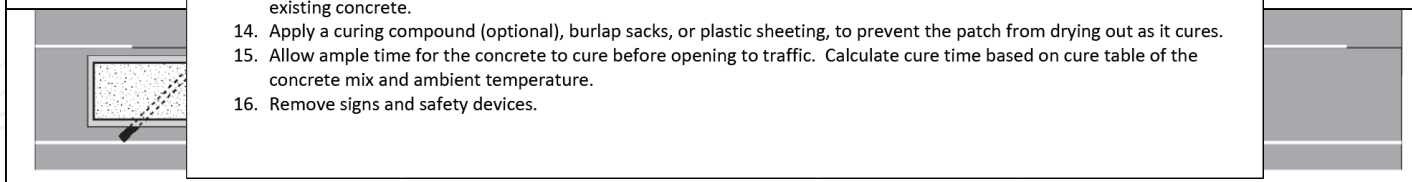
Crew Size

MEO

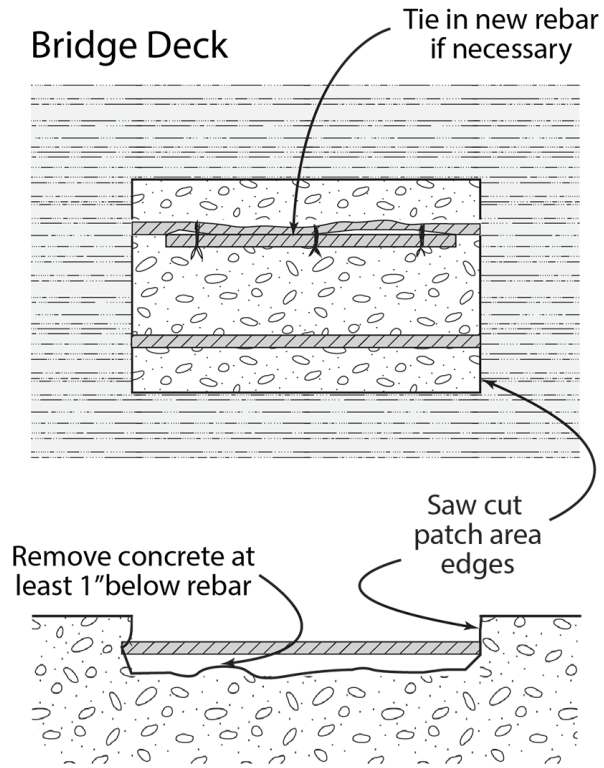
HEO (Optional)

Work Procedu

1. Place s
2. Ensure
3. Mark t
   prior t
4. Using a
   slope a
5. Excava
   does n



Work Procedure (continued)



8. Attach wood forms underneath the deck for any patches that extend completely through the deck,.
9. Mix concrete according to mixing instructions. Do not begin mixing concrete until enough patches are prepared to use the entire mixer load. Once concrete is mixed, use quickly. Do not let rapid setting concrete remain in mixer.
10. Apply bonding agent (optional) or lightly mist the patch area with water on all sides and the bottom, being careful not to pool water in the patch.
11. Fill the area, ensuring thorough compaction and leveling.
12. Use a concrete vibrator to ensure proper compaction around the rebar (Optional). Do not over vibrate.
13. Level the patch with the surrounding surface using a straightedge. Use a broom or tining tool to mimic the texture of the existing concrete.
14. Apply a curing compound (optional), burlap sacks, or plastic sheeting, to prevent the patch from drying out as it cures.
15. Allow ample time for the concrete to cure before opening to traffic. Calculate cure time based on cure table of the concrete mix and ambient temperature.
16. Remove signs and safety devices.

How It’s Used: Short to Long Term

- Used during daily crew briefings and task prep.
- Supports weekly planning and crew assignments.
- Guides seasonal scheduling and budgeting.
- Helps standardize training and documentation practices.
- Justifications for staffing and equipment levels.

What This Manual Is (…and Isn't)

The Manual Does…

- Outline technical and operational guidance for maintenance activities.
- Include select safety and traffic control notes where relevant to specific tasks.
- Support training by explaining the purpose, resources, and procedures for each activity.
- Help identify resource, scheduling, and training needs.
- Promote consistency across garages.

What This Manual Is (…and Isn't)

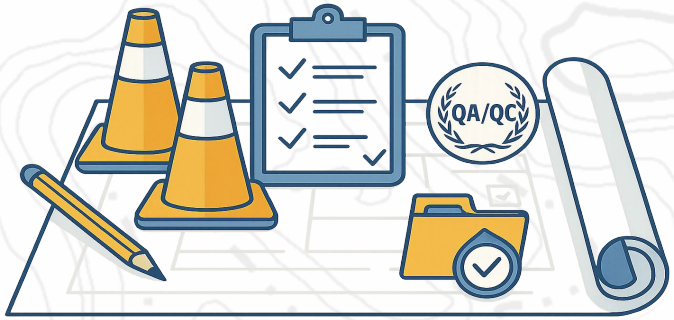
The Manual Does Not…

- Replace a formal safety manual or training program.
- Provide detailed safety protocols or traffic control plans.
- Instruct on how much is expected to be completed daily.
- Replace the need for operational leadership.
- Replace engineering influence.

Lessons Learned (Transferable Takeaways)

- Capture field knowledge before it's lost.
- Buy-in from employees improves quality and adoption.
- ADP values support planning — **not quotas**.
- Flexibility in execution is key.
- This structure is adaptable to agencies .

What's Next?



The Manual Is Just the Beginning…

Where can we go from here?

- Supports development of a QA/QC Program to monitor work quality and consistency.
- Provides data structure to feed a Maintenance Management System.
- Aligns with goals for Asset Management Planning and Reporting.
- Helps justify funding and support for new tools, staffing, and initiatives.
- Could serve as a foundation for Regional Coordination or shared best practices.

One County's Approach...

Questions & Discussion

Engineering Quality of Life®

ClarkDietz

Drew Storey, CSSBB

Client Relations Director

Drew.Storey@ClarkDietz.com

812.569.4060