

## **GUIDANCE FOR PAVEMENT CORING ON RESURFACING PROJECTS**

### **Introduction**

The intent of this document is to provide coring guidance for Connecticut Department of Transportation (CTDOT) pavement resurfacing projects on State-owned roadways. It may be used by State and/or consultant personnel that are responsible for designing these transportation facilities.

The primary purpose of coring a roadway during the design phase of a project is to verify the existing pavement structure conditions and depths, and to use that information to select an appropriate treatment or confirm the adequacy of a proposed resurfacing method.

For improvements that involve milling and paving, coring should be done to ensure that there is a stable surface after milling to place the overlay. Milling depths should be chosen that remove deteriorated layers and provide a layer for placing the new material that is sound. This is generally accomplished by avoiding the interface between existing pavement layers with the selected mill depth – staying slightly above an interface by approximately 1 inch, or slightly below an interface by approximately 1/2 inch. The targeted milling depth should also avoid exposing existing granular material by staying a minimum of 2 inches above the granular base or subbase. Consideration should also be given to the minimum pavement thickness that traffic will be traveling on after the initial mill. For instance, on an expressway with heavy truck traffic, selecting a mill depth that results in the remaining pavement being 2 inches thick may be adequate to avoid subbase exposure while being inadequate to support heavy loads even for short term use.

### **General Considerations**

This document provides guidance where representative coring is desired for a resurfacing project. The main considerations for planning a coring operation are the project's scope and size. With the variety of projects that the Department administers, the quantity of cores needs to be carefully considered. The number of cores should provide a general representation of the roadway needed to perform an accurate pavement design and to avoid major changes during construction.

Along with the proper number of representative cores, the location of where the cores are taken should also be considered. Cores can be taken in a variety of areas across the roadway limits – these areas may include the existing travel lanes, different locations within the lanes, shoulders (for potential traffic staging), exit and access ramps of highway sections, transverse joints (for composite roadways with underlying concrete pavement base), as well as through different distresses that could be present. Occasionally there may be locations of particular interest within a project where more coring is needed to further investigate individual areas of concern.

One final consideration is the number of cores that a crew can safely do within a work shift (typically 4-5 hours of actual core drilling). It has been found that an average crew of 2-3 members using a portable coring rig can retrieve 10 to 15 cores depending on the type of roadway they are working on (higher production may be possible with truck or trailer mounted rigs). Higher volume roads may require additional M&PT (Maintenance and Protection of Traffic), which may shorten a work shift; while other secondary roads may require less, extending the work shift. Improvement types that do not require extensive design efforts, such as pavement preservation surface treatments, should ideally target an amount of coring that can be completed in a single shift. Other resurfacing treatments, such as mill and overlay or rehabilitation, can aim for multiple shifts of work as needed to achieve a representative sampling of the project or roadway section limits.

## Recommendations

The table below is a general guide for the quantity of cores to take based on project scope, as well as the relevant information that should be collected in order to determine existing pavement conditions, layer thicknesses, and future mill depths (if appropriate for the selected treatment type). Deviations from the recommended table are acceptable, as this document is only intended to serve as a guide. It is expected that some projects could require more cores than shown in the table. For example, additional cores may be beneficial if conflicting information is found from as-built plans/historical records, or if cores already taken show significant variability in the existing pavement structure. However, it is generally suggested to not take fewer cores than the table recommends unless there is a specific reason to do so.

Type of Project Improvement		Minimum Recommended Number of Cores*	Approximate Spacing**
Rehabilitation	Peel/Pave, Reclamation, Recycling	12 - 15	0.10 mile to 0.25 mile
	Structural Overlay - Composite	10 - 12 (mainline)	0.25 - 0.50 mile (mainline)
		4 - 6 (transverse joints)	1 mile (transverse joints)
		2 - 4 (shoulders)	1 - 2 miles (shoulders)
Structural Overlay - Flexible	10 - 12	0.25 - 0.50 mile	
Mill and Overlay	Pavement Preservation	8 - 10	0.50 mile
	Maintenance/VIP	8 - 10	0.50 mile
Surface Treatment	Thin Overlays (UTBO, TFWC)	5 - 7	0.50 - 1 miles

\*per direction

\*\*may vary depending on project/section length

The following information shall be obtained for each core:

- Core ID with core number and direction of travel (e.g. 2-N)
- Route ID from LRS
- City or town
- Direction (northbound, southbound, eastbound, westbound)
- Mile point or approximate distance to nearest landmark (overpass, exit ramp, sign, etc.)
- Latitude & longitude (optional)
- Lane (high speed, low speed, center, auxiliary, shoulder, ramp, etc.)
- Location within lane (left or right wheel-path, center, edge of lane)
- Distress type (if applicable)
- Pavement type (asphalt, concrete) and thickness
- Base type (concrete, gravel, granular, macadam) and thickness if sampled
- Quality of bond between pavement lifts/layers (good, fair, poor)
- Quality of bond to underlying concrete base (if applicable)
- Image of core with measurement using a tape measure/ruler from top to bottom
- Other notable information or comments

Please contact the Pavement Design Unit at 860-594-3287 if you have any questions.