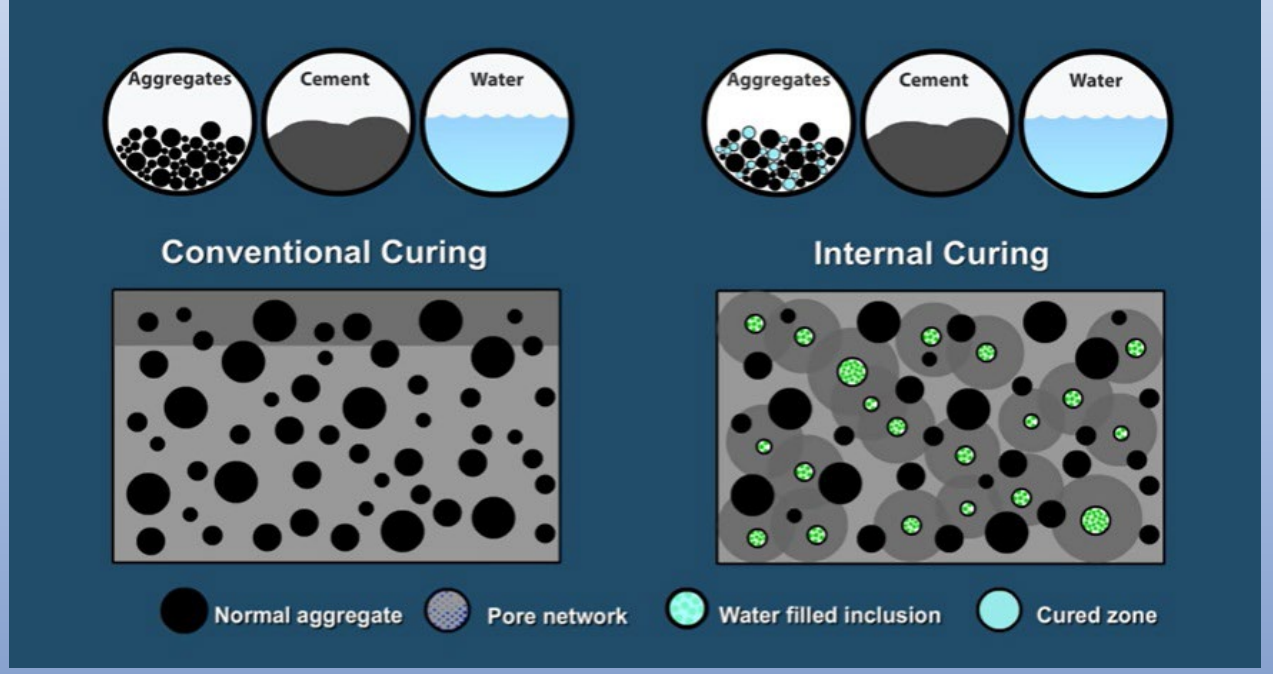
CIA TEAM

INFRASTRUCTURE PRESERVATION

NJDOT – Shivani Patel

FHWA – Nunzio Merla

EDC-7 Enhancing Performance with Internally Cured Concrete (EPIC²)



Purpose:

To implement the use of internally cured concrete to reduce shrinkage cracking and achieve long-term performance in concrete bridges, roads and repairs.

EDC-7 Enhancing Performance with Internally Cured Concrete (EPIC²)

Status:

- Applied for and awarded STIC Incentive program grant of $125,000

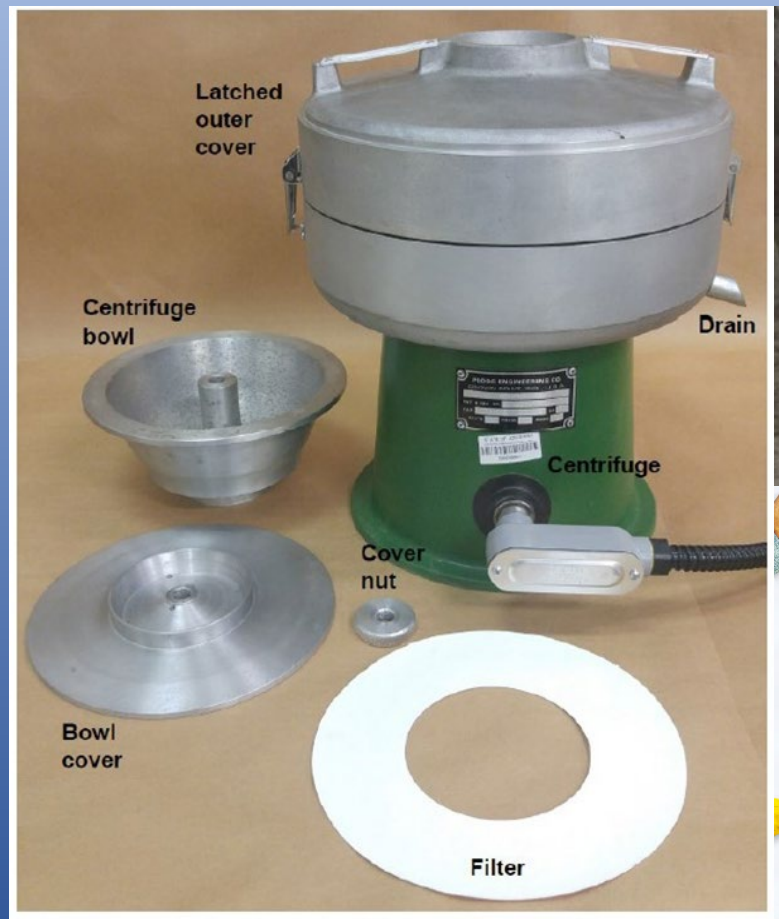


Figure 1—Centrifuge Apparatus (*Source: LTRC/DOTD*)

EDC-7 Enhancing Performance with Internally Cured Concrete (EPIC²)

Status:

- First NJDOT internally cured HPC bridge deck project awarded in October 2024

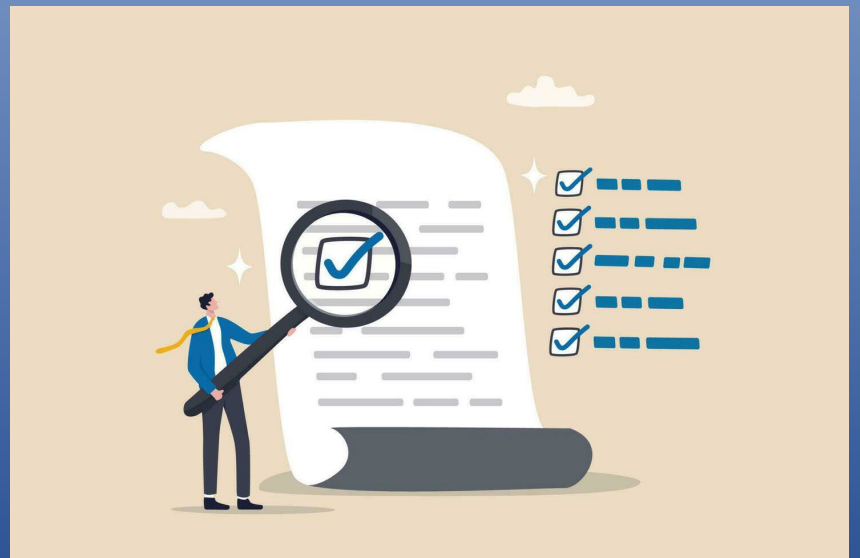
  -N. Munn Ave, Bridge over Rt. 280

- Construction scheduled to begin in Fall 2026

EDC-7 Enhancing Performance with Internally Cured Concrete (EPIC²)

Currently Working on:

- Preparing for the Final Design Submission of the candidate bridges
- Scoping projects for the candidate bridge list
- Coordinating the purchase of centrifuge apparatuses and other testing equipment

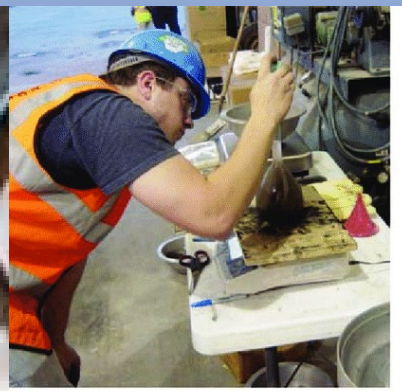


EDC-7

Enhancing Performance with Internally Cured Concrete (EPIC²)

Next Quarter:

- Continue engagement with concrete suppliers
- Purchase testing equipment
- Update the HPIC Specifications



(a)

(b)

(c)

(d)

Coming Soon!

- NJDOT will host EPIC² workshop in April 2025

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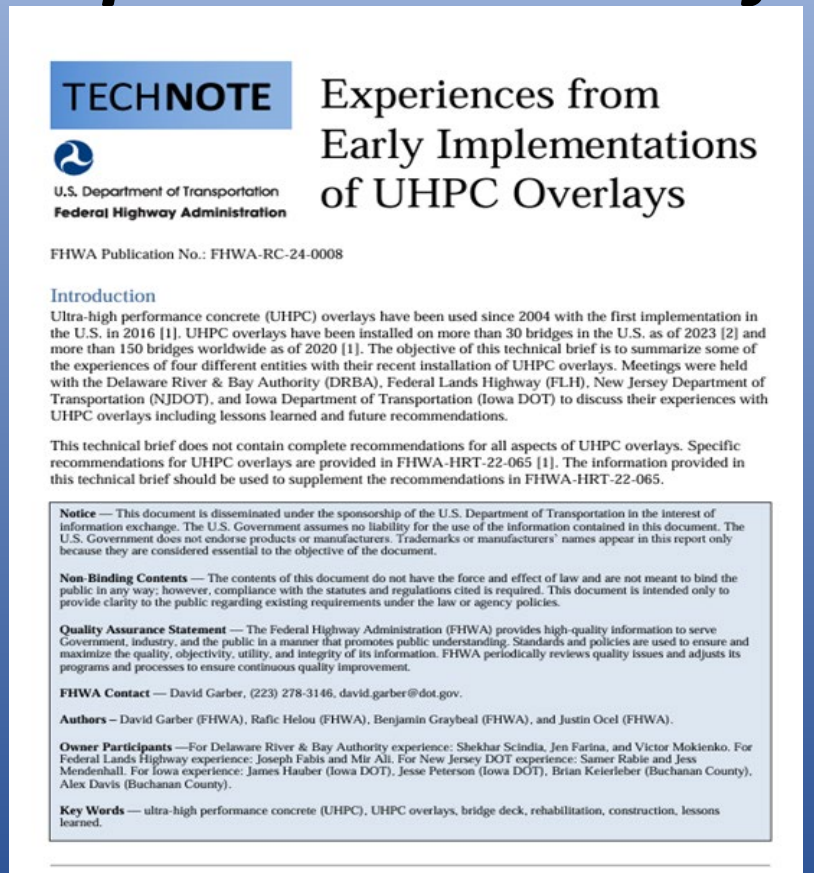
UPDATE on EDC-6 UHPC Innovation

- FHWA publication- "***Experiences from Early Implementations of UHPC Overlays***" released 12/2/24



TECHNOTE

U.S. Department of Transportation
Federal Highway Administration

Experiences from Early Implementations of UHPC Overlays

FHWA Publication No.: FHWA-RC-24-0008

Introduction

Ultra-high performance concrete (UHPC) overlays have been used since 2004 with the first implementation in the U.S. in 2016 [1]. UHPC overlays have been installed on more than 30 bridges in the U.S. as of 2023 [2] and more than 150 bridges worldwide as of 2020 [1]. The objective of this technical brief is to summarize some of the experiences of four different entities with their recent installation of UHPC overlays. Meetings were held with the Delaware River & Bay Authority (DRBA), Federal Lands Highway (FLH), New Jersey Department of Transportation (NJDOT), and Iowa Department of Transportation (Iowa DOT) to discuss their experiences with UHPC overlays including lessons learned and future recommendations.

This technical brief does not contain complete recommendations for all aspects of UHPC overlays. Specific recommendations for UHPC overlays are provided in FHWA-HRT-22-065 [1]. The information provided in this technical brief should be used to supplement the recommendations in FHWA-HRT-22-065.

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Key Words — ultra-high performance concrete (UHPC), UHPC overlays, bridge deck, rehabilitation, construction, lessons learned.

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RESOURCE CENTER

https://www.fhwa.dot.gov/resourcecenter/teams/structures-geotechnical-hydraulics/UHPC_Overlays_TechNote.pdf

EDC-7 Environmental Product Declarations **(EPDs)** for Sustainable Project Delivery

Summary of
Environmental Product Declaration

Central Concrete

Mix 340PG9Q1

San Jose Service Area

EF V2 Gen Use P4000 3" Line 50% SCM

Performance Metrics

28-day compressive strength	4,000 psi
Slump	4.0 in

Environmental Impacts

Impact name	Unit	Impact per m3	Impact per cyd
Total primary energy consumption	MJ	2,491	1,906
Concrete water use (batch)	m3	6.66E-2	5.10E-2
Concrete water use (wash)	m3	8.56E-3	6.55E-3
Global warming potential	kg CO2-eq	271	207
Ozone depletion	kg CFC-11-eq	5.40E-6	4.14E-6
Acidification	kg SO2-eq	2.26	1.73
Eutrophication	kg N-eq	1.31E-1	1.00E-1
Photochemical ozone creation	kg O3-eq	46.6	35.7

A sample EPD for a concrete mix design by Central Concrete Supply Co.

Credit: Central Concrete Supply

Purpose:

To identify and understand the environmental impacts from resource use, energy, and emissions in construction and consider alternatives using third party verified reports.

EDC-7 Environmental Product Declarations **(EPDs)** for Sustainable Project Delivery

Status:

- Coordinated with the New Jersey Asphalt Paving Association for list of BRBC mixture producers

EDC-7 Environmental Product Declarations **(EPDs)** for Sustainable Project Delivery

Currently Working on:

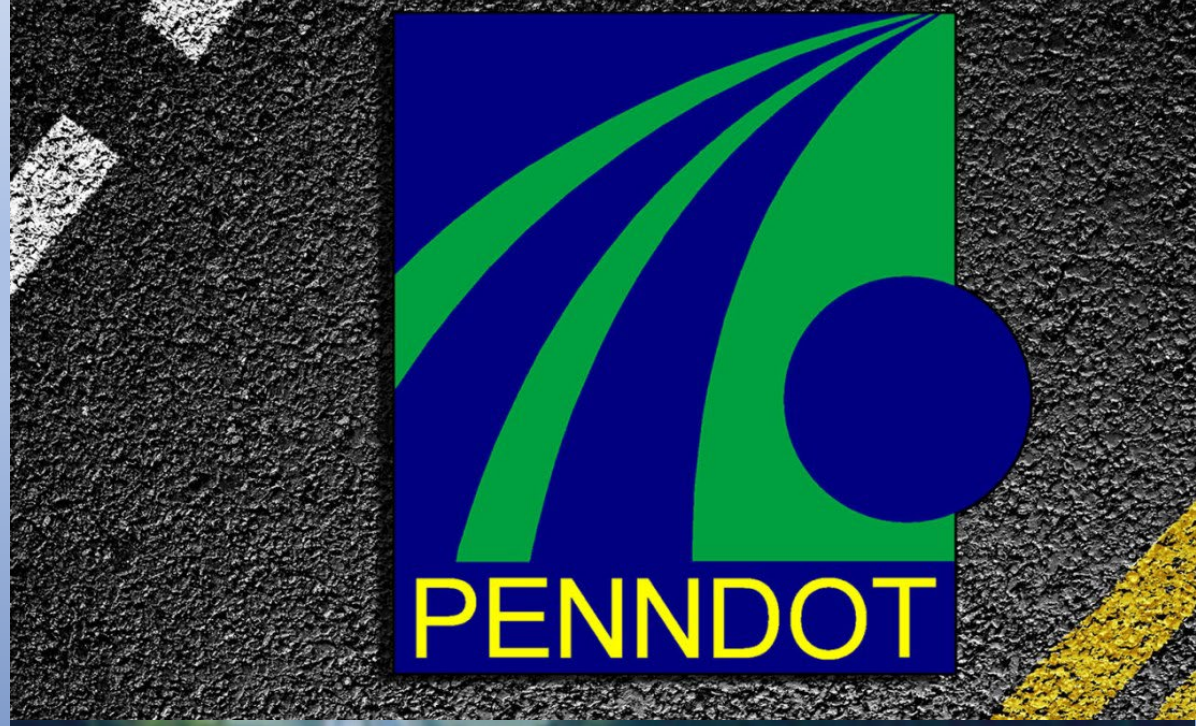
- Effort to create an EPD to produce BRBC mix asphalt

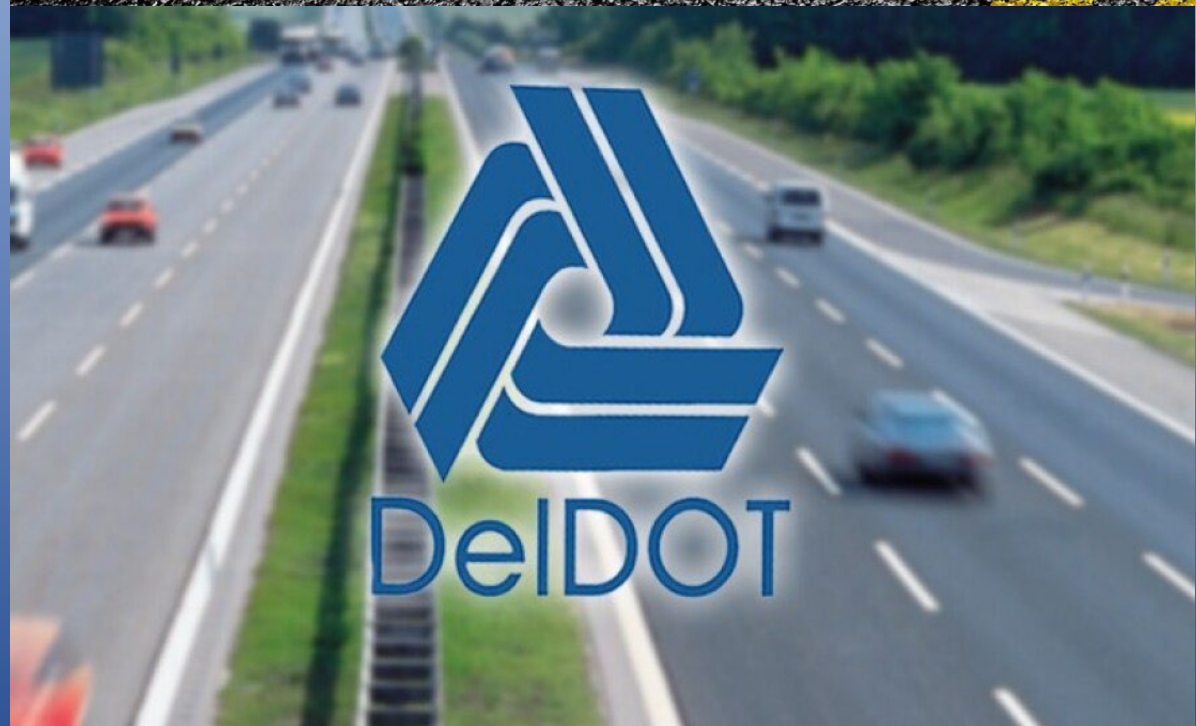
CLIMATE CHALLENGE

Notable EPD Institutionalization Efforts

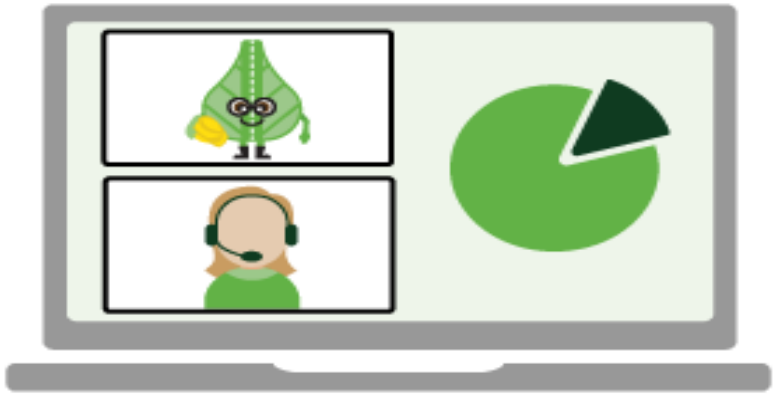
PennDOT-Goal to institutionalize by 2028 through partnership

DelDOT-Goal to use a specification with incentives and disincentives





EDC-7 Environmental Product Declarations **(EPDs)** for Sustainable Project Delivery



Next Quarter:

Continue working on:

- State outreach and research efforts
- Tasks related to FHWA's Climate Challenge