

# Cement Concrete Pavement Initiative

## MassDOT Board of Directors

*January 17, 2024*

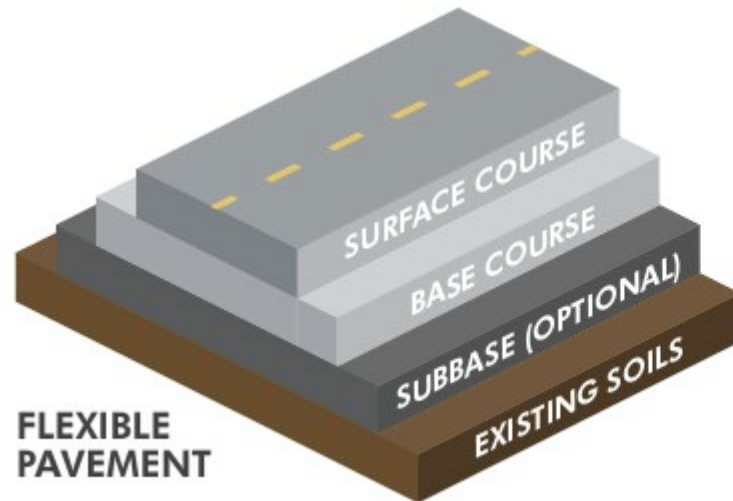


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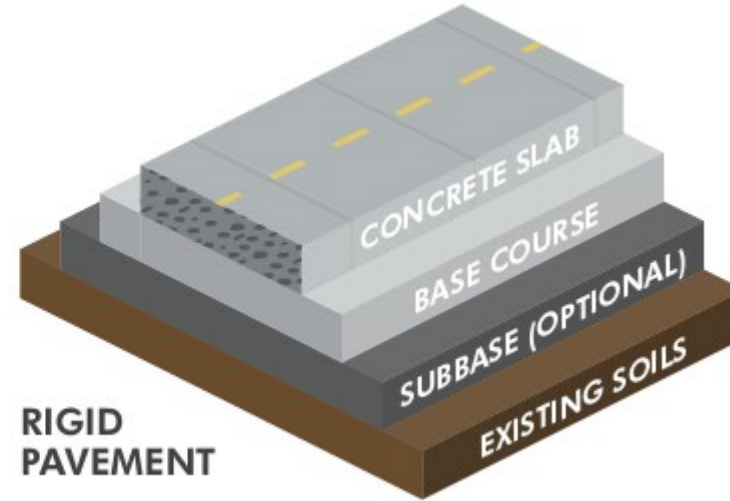
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# Pavement 101

Hot Mix Asphalt Pavements



Cement Concrete Pavements



- Pavements are classified as either flexible or rigid
- Flexible pavements, primarily consisting of Hot Mix Asphalt (petroleum-based & commonly known as “black top”), are more malleable due to the number of layers present in the structure, and tend to more directly impart loading to underlying soils
- Rigid Pavements typically consist of a single layer of cement concrete pavement (aka Portland Cement Concrete or PCC), and tend to distribute traffic loading evenly across the surface

# Massachusetts Pavements

## Hot Mix Asphalt Pavements



Route 24 Berkley, 2022  
Construction

## Cement Concrete Pavements



Route 20 Charlton, 2001  
Construction

- There are approximately 14 centerline miles of cement concrete pavements on the state-owned system (<0.5%), the remainder of the system is hot mix asphalt
- The limited use of cement concrete pavement in MA is consistent with other north-east states
- Cement concrete pavement was used for initial construction of many MA roads (RTES 1, 9 & 20 – I 191 & 495) however Hot-Mix Asphalt became the prominent choice for state surfacing due to a number of factors

# Portland Cement Concrete vs Hot-Mix Asphalt

## Hot Mix Asphalt Pavements

Pros	Cons
Lower Initial Cost, higher maintenance cost	Comparatively lower longevity, +/- 15 years before resurfacing
Short construction duration, (e.g return to service in hrs)	Comparatively more frequent interventions
Better ride quality and friction	
High availability of suppliers and skilled contractors	

## Cement Concrete Pavements

Pros	Cons
Higher Longevity, +/- 40 Years	High Initial Cost, low maintenance cost
High stability and resistance to *rutting	Construction is lengthy and disruptive (e.g. return to service in days)
	Access to underground utilities more difficult
	Limited regional contractor-base

\*Ruts are longitudinal depressions cause by repeated vehicle loading

# Current State

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- MassDOT Pavement Management's mission is to maximize the effectiveness of the Commonwealth's investment in pavement to achieve high quality roadways, at least life cycle cost and maximum sustainability
- Within these objectives, cement concrete pavement is considered where the current roadway is Portland Cement Concrete (e.g. Route 5 Holyoke/W. Springfield) or local characteristics would benefit from Portland Cement Concrete (Route 20 Charlton picture earlier, steep downgrade susceptible to shoving)
- Recently, MassDOT has partnered with Mass. Concrete & Aggregate Producers Assoc. (MaCAPA) to evaluate whether there is value in increasing the use of Portland Cement Concrete in MA road construction

# Current Portland Cement Concrete Projects

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- District 3: Charlton/Oxford Route 20 (602659) **(In Construction)**
  - Design Build Contract, Median U-turns explored for Cement Concrete Pavement
- District 4: Route 1 Newbury/Newburyport/Salisbury (608494) **(In Construction)**
  - Pavement Resurfacing Contract, introduced intersection for Cement Concrete Pavement
- District 2: Holyoke/W. Springfield Route 5 (604209) **(In Construction)**
  - State of good repair programmed for resurfacing. existing Cement Concrete Pavement
  - Through public outreach, design/sched changed, rehab exist. and new Cement Concrete Pavement
- District 3: Spencer/E. Brookfield Route 9 Resurfacing **(Design)**
  - During design development: Bicycle, Pedestrian and Safety Improvements identified
  - Project Split into 3 segments, one each town and Route 9/49 Intersection (613097)

# Next Steps

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- Assess ongoing projects/identify new project opportunities
- Identify Higher Level Benefits of Cement Concrete Pavement
- MIT Concrete Sustainability HUB Presentation/Meeting 1/19/2024



Thank You

