How does MDOT’s pavement design and construction compare to neighboring states?

Pavement Design Standards
MDOT has developed a comprehensive strategy to maintain the statewide pavement network including:
• Performance models to monitor the “health” of the transportation system,
• A life-cycle cost process to assess and select the most cost-effective pavement materials, and
• A progressive pavement warranty program to further protect pavement projects.

MDOT follows national design standards developed by the American Association of State Highway and Transportation Officials (AASHTO).

MDOT was recognized by the Federal Highway Administration (FHWA) in 2012 as having one of the best materials acceptance processes in the country. FHWA specifically identifies Michigan as a very established and mature pavement quality assurance program.

Materials Standards
MDOT works to ensure the longevity of Michigan’s pavement by using the highest quality materials. High performance material specifications are used to reduce future maintenance costs.

MDOT’s commitment to continuous improvement
MDOT works with Michigan universities to research:
• applications of new materials,
• process improvement for construction and maintenance, and
• new technology at sites along the transportation network under live conditions.

MDOT relies on in-house research as well as the engineering and scientific expertise of many Michigan universities.

MDOT is a partner with the nationally recognized Michigan Transportation Asset Management Council (MTAMC). Comprised of local agencies, MTAMC collects and manages pavement condition data on federal-aid-eligible roads. The council works diligently to maximize the impact of investment in the state’s roads and bridges.

MDOT’s cost-effective choices to achieve quality pavement in the face of serious challenges.
Road use and infrastructure investment compared to states in the Great Lakes region

Facts:

- More than 97 billion vehicle-miles are traveled on Michigan roads each year.
- Traffic levels in Michigan are 5 percent above the average for the region.
- Michigan’s road system is larger than both New York (NY) and Pennsylvania (PA); but state transportation investment is $3 billion less than NY and $2 billion less than PA.
- Michigan ranks 2nd in annual vehicle repair costs to registered drivers.
- Michigan ranks 4th in excise tax rates on gasoline and diesel.
- Motor fuels in Michigan are subject to sales tax, but none of the revenue is allocated to roads.
- Michigan ranks 3rd in average vehicle registration fees.

What design, construction, and maintenance challenges does Michigan’s pavement face?

Soils and geotechnical impacts on pavement designs

Pavement design and construction in Michigan can be complicated and costly, because Michigan soils are often:

- variable,
- extremely frost-susceptible,
- contain deep, soft clay deposits, and
- destabilized by the variable water tables of the Great Lakes and 11,000 inland lakes.

Multiple layers underneath the pavement are constructed to provide a solid, long-lasting substructure to hold against human and environmental wear and tear.

The impact of climate

Michigan’s climate also contributes to the deterioration of pavements. Freeze/thaw cycles, de-icing materials and salt contribute to pavement deterioration.

Here’s how cold weather causes potholes:

1. Water seeps into the soil below the road surface.
2. As water freezes the soil expands, and thawing causes soil levels to return, but pavement often remains elevated, creating a cavity.
3. Driving over the cavity causes pavement to collapse. This cycle causes conditions to worsen, leading to more potholes.

In summer months, extreme heat can affect some pavement, making them susceptible to:

- rutting,
- buckling, and
- raveling.

Heavy rainfall also can damage roadways if drainage systems fail.