NATIONAL PAVEMENT PRESERVATION CONFERENCE

IMPACTS AND BENEFITS FROM PAVEMENT PRESERVATION

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Indianapolis, Indiana

Arizona Department of Transportation

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ADOT

NATIONAL PAVEMENT PRESERVATION CONFERENCE
npc23
IMPACTS AND BENEFITS FROM PAVEMENT PRESERVATION

ncpp
National Center for Pavement Preservation
MICHIGAN STATE UNIVERSITY

AASHTO TSP2 PAVEMENT PRESERVATION

ROCKY MOUNTAIN WEST PAVEMENT PRESERVATION PARTNERSHIP
SOUTHEAST PAVEMENT PRESERVATION PARTNERSHIP
MIDWESTERN PAVEMENT PRESERVATION PARTNERSHIP
NORTHEAST PAVEMENT PRESERVATION PARTNERSHIP

Topics to Discuss

- Pavement Asset
- Pavement Management Needs (Funds)
- Fair Pavement & Preservation
- Impacts of Weather
- Potholes
- Rehabilitation

Pavement Asset

- Arizona has about 21,355 mainline through LM
- 30,557 Maintenance LM including everything (shoulders, ramps etc.)
- Pavement is the largest asset with a value of $13.86 billion
- ADOT used following asphalt quantities on highway projects a year

Year	Asphalt used Tons
2009	2,380,879
2010	2,220,750
2011	2,338,237
2015	1,487,271
2016	1,432,831
2017	1,666,881
2020	1,049,038
2021	839,432
2022	831,194

Pavement Management Needs (Funds)

Tentative Budget

- Preservation - $36 M State Funds
- Life Extension - $16 M
- Rehab/Urban Preservation/Reconstruction - $320 M

Estimated Cost

- Cost to bring pavements up to fair condition or better - $2.28 billion
- After that, annual maintenance cost - $307 million / Yr. first 10 yrs.
- Cost to bring pavements up to good condition - $4.63 billion
- After that, annual maintenance cost - $146 million / Yr. first 10 yrs.

MAP 21 Performance Measure & Fair Pavement

MAP 21 Performance Measure

Measure	IRI in/mile	Cracking %	Rutting in
Good	<95	<5	<.20
Fair	95-170	5-20	.20-.40
Poor	>170	>20	>.40

Fair

Fair Pavement 3 Subdivisions –T (Top 1/3rd.), M– (Middle 1/3rd.), B– (Bottom 1/3rd)

Fair Good - At Least 1 T & 2 better than M

Fair Poor – At least 1 B or worse

Fair Fair – At Least 1 M & 2 better than B

Fair 3 Subdivisions – Combinations

	Measure 1	Measure 2	Measure 3				
Good	G	G	G				
Poor	P	P	G				
	P	P	F				
	P	P	P				
Fair	G	F	P	G	T	P	**Fair Poor**
				G	M	P	**Fair Poor**
				G	B	P	**Fair Poor**
	F	F	F	T	M	B	**Fair Poor**
				T	T	T	**Fair Good**
				M	M	M	**Fair Fair**
				B	B	B	**Fair Poor**
				T	T	M	**Fair Fair**
				T	T	B	**Fair Poor**
				M	M	T	**Fair Fair**
				M	M	B	**Fair Poor**
				B	B	T	**Fair Poor**
				B	B	M	**Fair Poor**
	G	G	F	G	G	T	**Fair Good**
				G	G	M	**Fair Fair**
				G	G	B	**Fair Poor**
	G	G	P	G	G	P	**Fair Poor**
	F	F	G	T	T	G	**Fair Good**
				M	M	G	**Fair Fair**
				B	B	G	**Poor Fair**
				T	M	G	**Fair Fair**
				T	B	G	**Poor Fair**
				M	B	G	**Poor Fair**
	F	F	P	T	T	P	**Poor Fair**
				M	M	P	**Poor Fair**
				B	B	P	**Poor Fair**
				T	M	P	**Poor Fair**
				T	B	P	**Poor Fair**
				M	B	P	**Poor Fair**

Pavement Preservation

Fair Good Pavement (Top 1/3rd of Fair approx.)

Light Preservation Treatments

- Fog Seals
- Crack Seals
- Slurry Seals
- 1/2” Chip Seals
- Type 3 Micro Surface

Pavement Preservation

Fair Fair Pavement (Middle 1/3rd of Fair approx.)

Medium Preservation Treatments (Life Extension)

- Up to 50% of the Project Lane Miles
  - 2” AC Mill & Replace Surface Preparation
- Up to 20% of the Project Lane Miles
  - 4” AC Mill & Replace Spot Repair

Pavement Preservation

Fair Poor Pavement (Bottom 1/3rd of Fair approx.)
Heavy Preservation Treatments (Life Extension)

- Old Surface Treatment Removed (Micro Milled)
- Minor AC Mill & Replacement (2” Surface Prep & 4” Spot Repair)
- Two Pass Type 3 Micro Surface (Rut Filling)
- Cape Seal (Type 3 Micro Surface on ½” Hot Applied Chip Seal)
- ½” Friction Course (ARFC & AR-ACFC)
- 1” Bonded Wear Course (Spray Paver Applied)

Pavement Rehabilitation & Reconstruction

Poor Pavement

- Major Rehabilitation

Poor Pavement, Too Many Rehabilitations, Failed Pave

- Reconstruction

Reactive Maintenance

- Potholes Filling
- Asphalt Patching

Causes of Potholes

- All roads experiences expansion and contraction due to temperature changes during day and night and form surface cracks
- Cracks allow water to seep into pavement
- Traffic pressure compresses cracked pavement and squeezes some water back out along with pavement materials creating voids, potholes, and craters
- In cold climate, potholes development can be exacerbated by freeze-thaw action
- Aging asphalt and poor drainage accelerate the deterioration of distresses
- Hotter and drier weather can produce fewer potholes
- Due to fluctuation of temperatures, potholes show up in early spring

Potholes Prevention & Preventive Maintenance

- Proper drainage
- Early action; seal the cracks at first sight and repel water from entering into pavement.
- Crack Sealing and Sealcoating.
- Seal Coat should be fluid enough to enter the hairline cracks
- Untreated/unsealed cracks most likely become potholes
- Usually, pothole patching is done on the surface only; it does not take care of the fatigue cracks. So, potholes come back on the same locations.

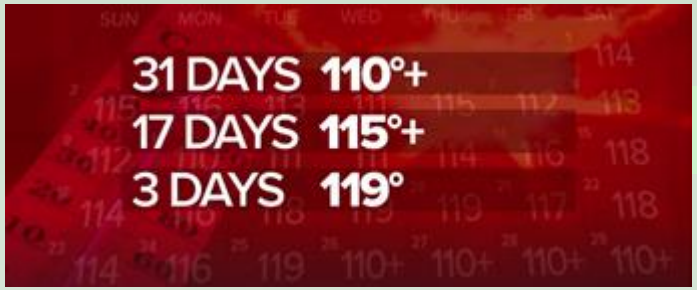
Arizona's weather

- Temperature ranges from minus 40 (record) to 128 degree F (record)
- Elevation 70 feet to 12,633 feet.
- Nationally - Denali, Alaska - 20,320 feet; Death Valley, CA - 282 feet.

Last winter and summer were very rough in AZ

Arizona Weather

July 2023 sets multiple new heat records across Arizona



abc 15 ARIZONA

Latest winter storm breaks snow records in northern Arizona

Over 11 feet of snow recorded in northern Arizona during winter season

Record snow still has some highways closed

During the peak of the storms, nearly 12 highways were shut down at once.

azcentral.

Potholes - Arizona

- Potholes in pavement pop up quickly when moisture seeps into asphalt.
- In northern Arizona, situation is exasperated by combination of freezing overnight temperatures and daytime thawing.
- Flagstaff area usually experiences 200+ daily freeze-thaw cycles a year.
- Under pounding of heavy traffic, stressed pavement breaks away.
- Extreme weather prevailed over preventive & mitigation measures.
- AZ highways were subjected to potholes.

Potholes - Arizona

Arizona Department of Transportation sees rise in potholes following busy winter

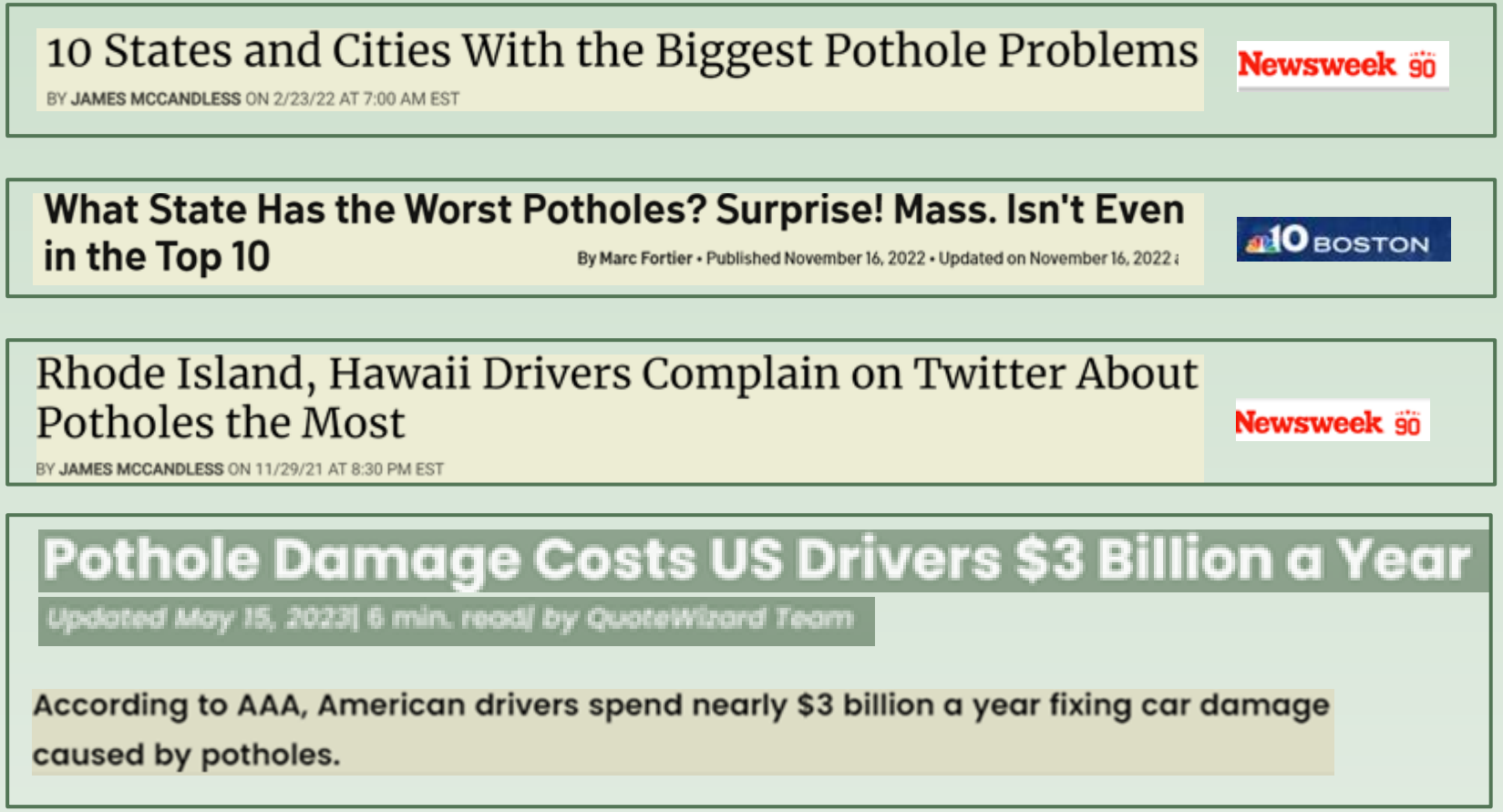
Pothole problems on I-40 near Kingman worsen in winter conditions

Arizona plans to sink more than $85 million into potholes, other repairs

Pavement Rehabilitation

- Pothole sections went beyond preventive maintenance; some roads are old
- Pothole sections are potential rehabilitation candidates now
- It is challenging to factor in potholes in pavement condition evaluation/analysis
- Potholes data may not be collected timely
- Many times, potholes data are collected before the pothole cycles or data are collected after the pothole cycle when potholes already received emergency/temporary patch.
- For now we are using alternate pothole data in pavement condition evaluation. Districts are entering all patch works data with patching cost into database regularly and timely. We are using the per lane mile patching cost to figure the extend of potholes in a section of road.

Potholes - Nationally



10 States and Cities With the Biggest Pothole Problems

BY JAMES MCCANDLESS ON 2/23/22 AT 7:00 AM EST

Newsweek 90

What State Has the Worst Potholes? Surprise! Mass. Isn't Even in the Top 10

By Marc Fortier • Published November 16, 2022 • Updated on November 16, 2022

10 BOSTON

Rhode Island, Hawaii Drivers Complain on Twitter About Potholes the Most

BY JAMES MCCANDLESS ON 11/29/21 AT 8:30 PM EST

Newsweek 90

Pothole Damage Costs US Drivers $3 Billion a Year

Updated May 15, 2023| 6 min. read| by QuoteWizard Team

According to AAA, American drivers spend nearly $3 billion a year fixing car damage caused by potholes.

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Question ?