Potholes: Prevent Before They Present

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TRB/ AASHTO Transportation Infrastructure Maintenance and Operations Conference, July 21, 2015  Des Moines, IA
Potholes

- irritating to drivers, source of many complaints
- cost millions of dollars annually in vehicle repairs
- cause accidents
- add to delays and increased congestion
- indicative of other problems
Potholes

Potholes defined:

• potholes are at least 2” deep with pronounced edges
• caused by sub-surface deterioration
Potholes

What are not potholes:
• depressions in *unpaved* roads
• rutting
• “shoving” or “wash-boarding”
• transverse cracks
• delamination
• punch-outs
• Sinkholes, wash-outs
• Failed utility cuts
• buckling
Potholes

Prevention begins with good construction

Paving in New York City, 1870s
Potholes

Roman road-builders had the right ideas:
• first paved roads built of gravel, cobbles, flagstones
• graded, layered, crowned, ditches for drainage
• lasted for hundreds of years
• same principles used today
Potholes

Modern pavement design... good drainage essential

- cross-slope
- grade
- shoulders
- ditches and culverts
- curb and gutter
- storm-water inlets
- retaining walls
- bridge and overpass piers
Potholes

Most potholes form in winter

- water penetrates, dissolves, erodes
- embedded water freezes, expands
- ice thaws, leaves void
- vehicles exert dynamic loading
- pavement over-flexes, breaks
- water infiltrates, weakens base
- traffic wears away broken pavement
- water ponds in the hole
Potholes

But potholes also occur in warm weather:

• poor drainage accumulates water under pavement
• traffic forces surge of water due to compression
• surge washes away poorly compacted base
• resulting void cannot support pavement
Potholes

regular pavement maintenance a preventive practice:

• crack-sealing
• surface sealers; rejuvenators
• patching
• resurfacing
  • chip –seal
  • micro-seal
  • mill and overlay
Potholes

Defects that foretell potholes:

• “alligator cracking” indicates structural problems
• “block cracking” from environmental actions”
• “ponding” in depressions
Potholes

Aggressive corrective measures:

• base repairs
• “wedging” to eliminate low spots
• spot-milling to eliminate ruts
• better inspection of utility cut repairs
• Cleaning ditches and curb inlets
• “find and fix” systematic patrol
• Quick response to complaints
Potholes

Drainage systems maintenance: keep the water moving!

- shoulders
- ditches and culverts
- curbed streets
- inlets or “catch basins”
- snow and ice operations
- Springs and seeps
- Water system leaks, over-irrigation of lawns
Potholes

Pothole repair methods:

- cold patch
- hot- patch
- spray injection
- automated
Potholes

Worker safety

- one of the more dangerous tasks for maintenance personnel
- hi-vis vests
- signs, message boards
- warning lights on vehicles
- flagger(s)
- follow-truck
- police presence
Potholes

Pothole Data Analysis

- Complete and precise documentation vital
- Operational---effectiveness of methods and materials
- Systematic---develop schedule for concentrated corrective actions to prevent recurrence
- Programmatic---use data with PCI to assess overall condition of pavement
Potholes

Information and References:

- The Hole Story
  APWA bookstore

- Anatomy of a Pothole
  http://youtu.be/I7KPoSVoFZE

- VDOT: Phil Itkwik Is Back Hunting Potholes!
  https://www.youtube.com/embed/JeC-MxbOIU4
Potholes

Questions? Comments?

![Cartoon image of potholes and workers]