



**TRB**  **2020**  
ANNUAL MEETING

99<sup>TH</sup> Annual Meeting  
Washington, D.C.  
January 12–16, 2020

# TRANSPORTATION OPERATIONS SYSTEMS & SUPPORT

**Parth Oza, Operations Support and Engineering**  
**Asim Frank Zaman, MBEG, P.E.**

# St. Paul Minnesota - MnDOT

- No standardized approach
- Did massive community outreach
- Progressively moved people out to specified shelters
- Cleared and Grubbed the area to a depth of 1' (buried needles)
- Blocked the area off using Jersey Barrier and Fencing



What does  
NJDOT do?



Started the system in 2010

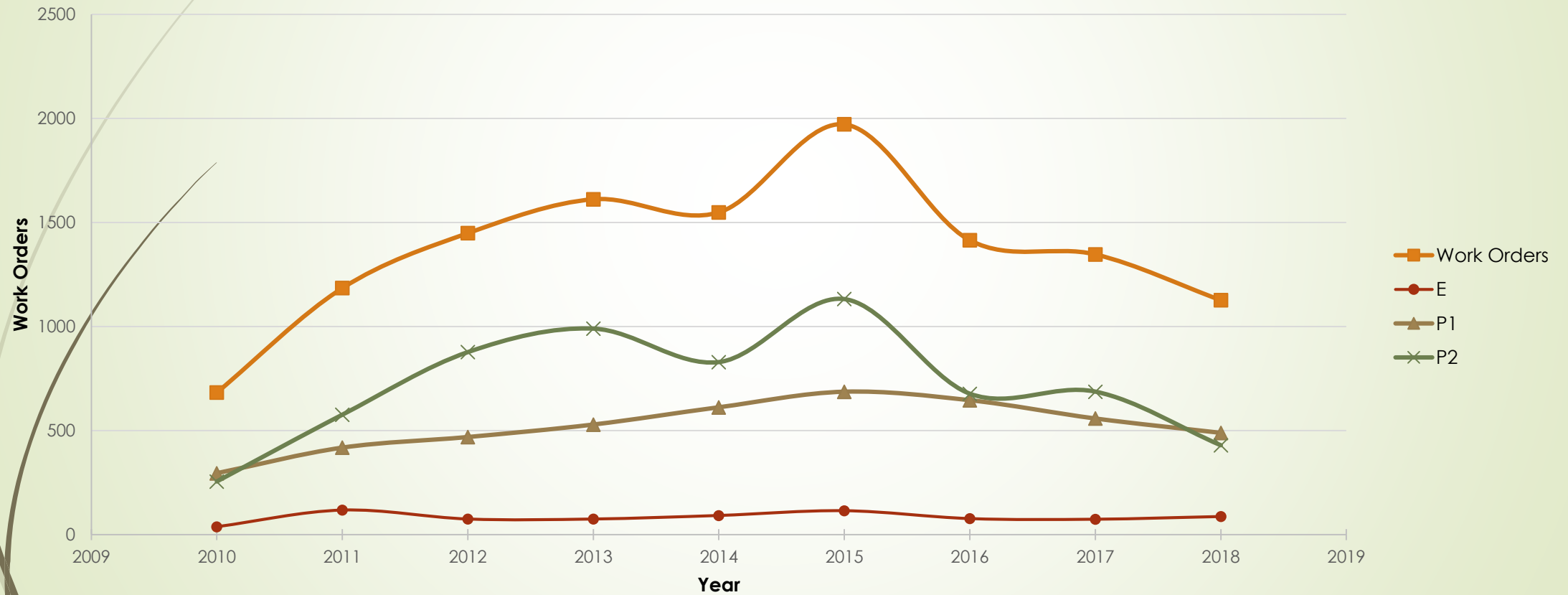
There have been 21,000  
work orders



Currently 4,700 open Work  
Orders

Work Order  
Status

# NJDOT Bridge Work Orders by Year

NJDOT Work Orders by Year & Type



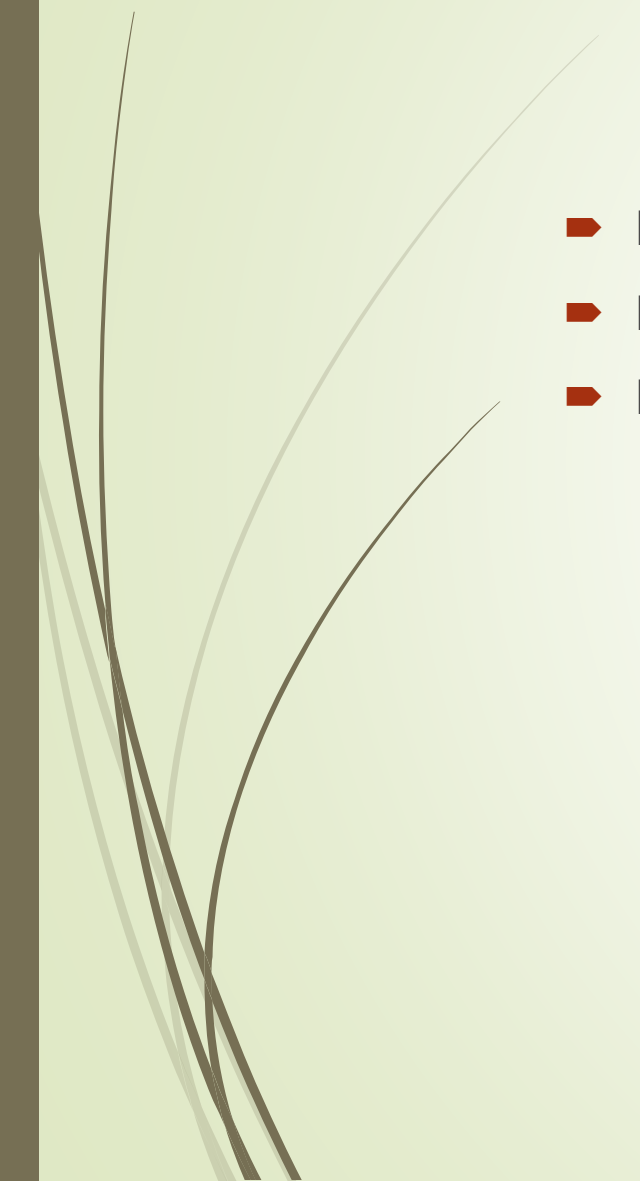


Total WO	21653	
Open WO	4712	
Max Open Homeless WO	30	0.6%
Max Total Homeless WO	74	0.3%

## Work Order Analysis



# Why is this a challenge?

- ▶ Homeless encampments → Fires → Structural Damage
  - ▶ Prevent access for maintenance and inspection activities
  - ▶ Pose danger to the homeless from traffic and other sources
- 

# Engineering Solutions

- ▶ MENNAS System
  - ▶ Non-Structural concrete to make bridge pedestals less habitable.
- ▶ PEDE Program is designing applications of this in...
  - ▶ Camden
  - ▶ Newark







# Other Solutions?

- ▶ Does NJDOT have a standardized procedure?
  - ▶ Do we have a library of outreach contacts to tackle these work orders?
- 



For



# Public Acceptance Automated Vehicles

## Partners for Automated Vehicle Education

@PAVECampaign

A coalition of industry, advocacy, academic & institutions informing the public the future of our roads. Safety. Mobility. Sustainability. #PAVEtheWay

[pavecampaign.org](http://pavecampaign.org) Joined September 2018

166 Following 1,666 Followers

Tweets

Tweets & replies

Media

Li

Pinned Tweet



Partners for Automated Vehicle Education @PAVEC... · Dec 26, 20

We are a broad coalition of #safety, #mobility and #sustainability adve and industry participants engaging with the public in a conversation a the potential of #AV technology. We're a bet on the power of knowled #PAVEtheWay

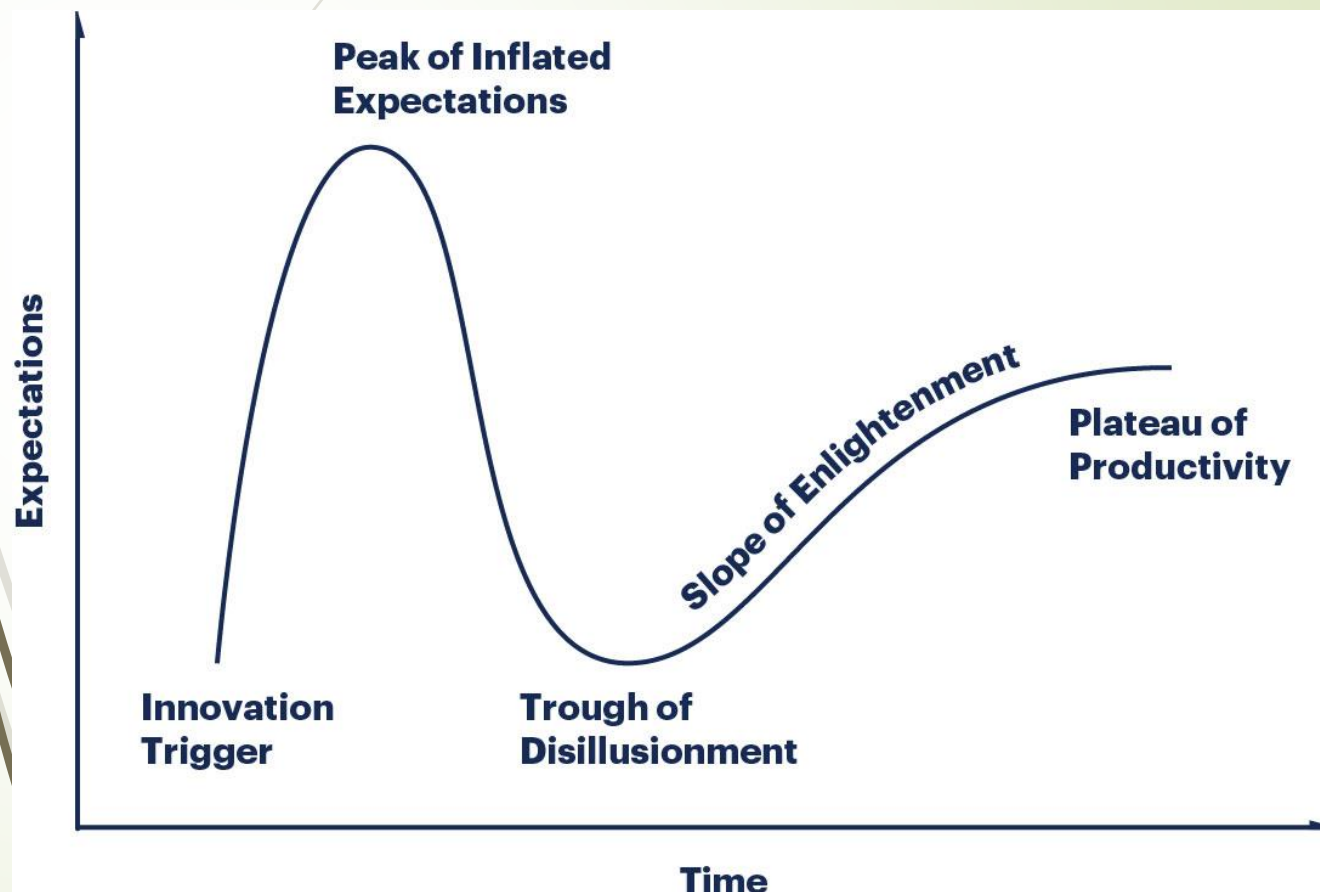


Partners for Automated Vehicle Education  
PAVE is a diverse group of stakeholders from indu academia, government, plus advocates for safety, [youtube.com](http://youtube.com)



5

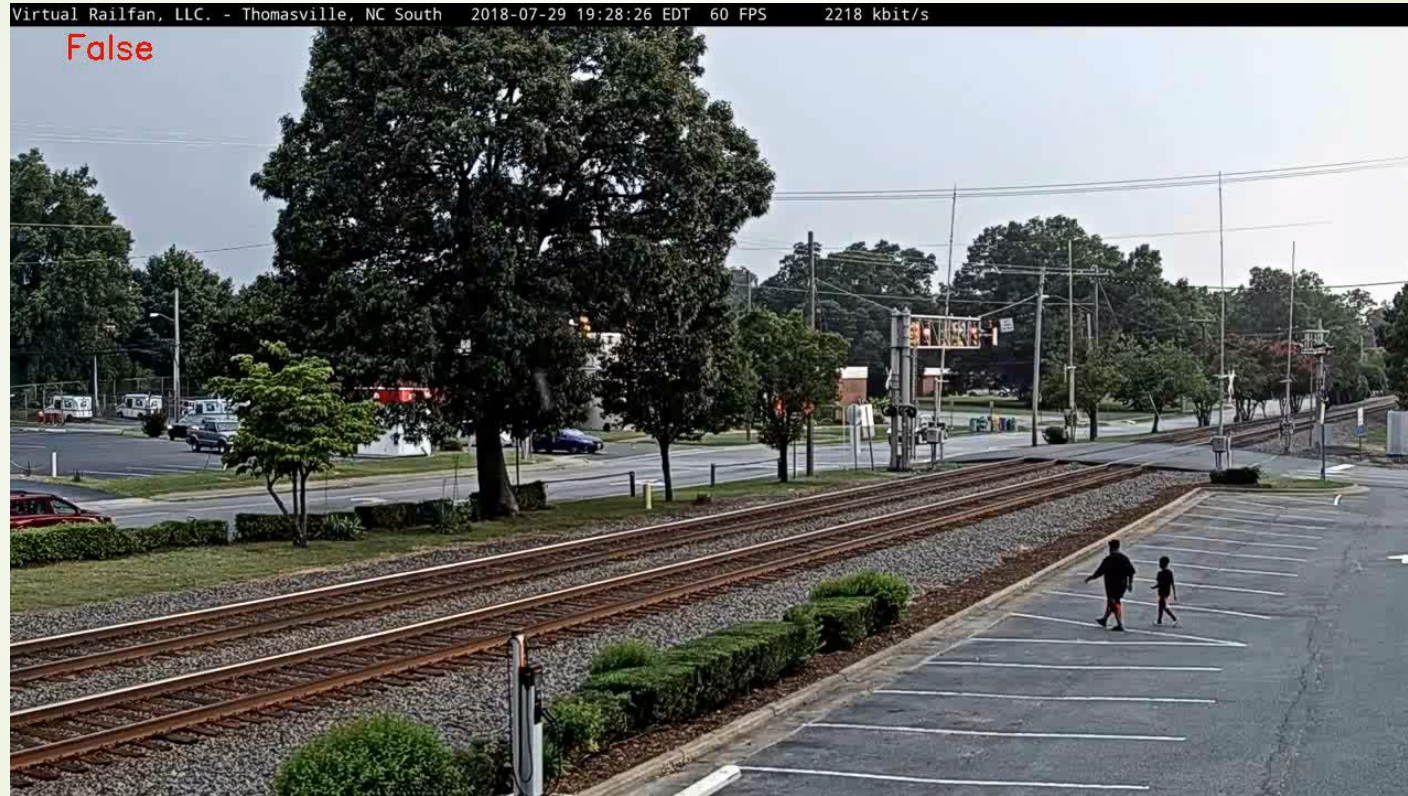
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# Railroad Trespassing Detection



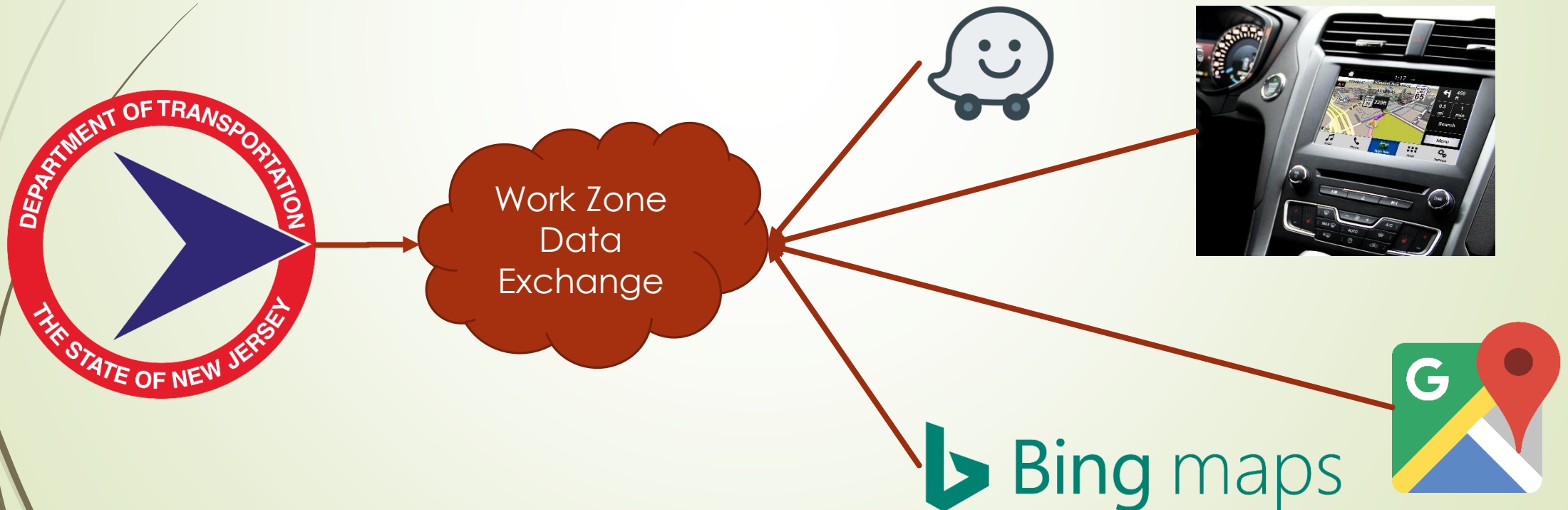
# Railroad Trespassing Detection



# Connected Autonomous Workzone

*“Harmonized specification for work zone data that infrastructure owners and operators can make available as open feeds that AVs and others can use” – FHWA Round Table*

<https://www.transportation.gov/av/data>



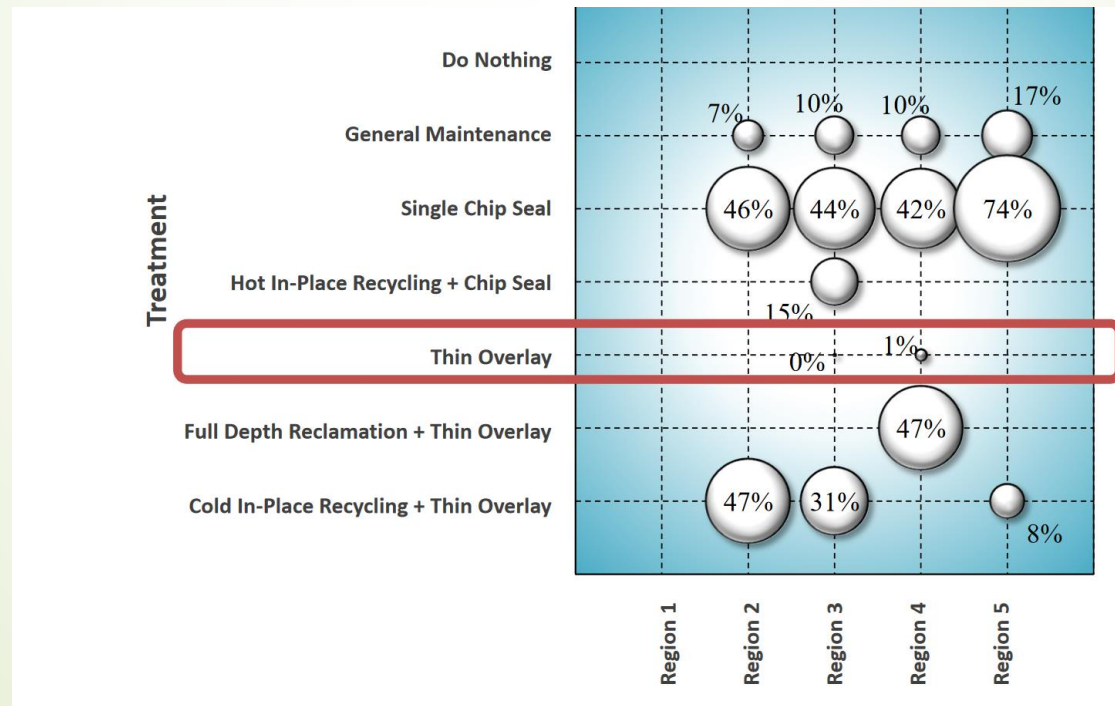


**\$420 Billion**

**Value of US road networks  
maintenance backlog**

# Optimizing Pavement Management Systems

- Study by University of Wyoming and Colorado State University
- Optimized Budget Allocations:





**\$73.51**  
**Cost of road  
salt per ton**

Winter Maintenance Field Evaluation of Salt Brine Applications, University of Wisconsin – Madison

Boris Claros, Madhav Chitturi, Andrea Bill, David Noyce



# Benefits of Brining

- Comparison Analysis Salt Brine vs Granular Salt:

Description	Salt Brine Group	Granular Salt Group	Comparison	
Average Salt Usage (lb/ln-mi)	870	1,313	-443	-34%
Average Cost Material Salt Brine \$0.08/gal (\$/ln-mi)	\$38	\$49	-\$11	-22%
Average Time to Reach Bare/Wet Conditions (hr)	11.2	16.3	-5.1	-31%

Winter Maintenance Field Evaluation of Salt Brine Applications, University of Wisconsin – Madison

Boris Claros, Madhav Chitturi, Andrea Bill, David Noyce



**149**

**Number of Maintenance  
Facilities that MnDOT  
operates**

Optimizing Maintenance Facility Location in Minnesota

William Holik, Paul Anderson, Texas A&M

# Optimizing Facility Locations

- ▶ Factors considered:
  - ▶ Location of current maintenance facilities
  - ▶ Maintenance routes
  - ▶ Amount of maintenance equipment
  - ▶ Equipment material capacities
  - ▶ Material application rates
  - ▶ Size and location of available land
- ▶ **Primarily driven by winter operations!**
- ▶ Results:
  - ▶ 58 facilities could be rebuilt on site
  - ▶ 89 could be relocated
  - ▶ 2 could be combined



<https://www.keloland.com/news/minnesota-family-builds-snow-dinosaur/>