# **DRIVE -** A Customized, Implementable Solution to Pavement Management



Fall Meeting November 2021

### Welcome

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### **Presentation Outline**

- Principles of Pavement Management
- Data Collection Alternatives
- Pavement Treatment Quiz Game
- Data Analysis & Planning DRIVE



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### **Objectives of Pavement Management**

- Protect Your Investment: Maximize pavement life span
- Safety: Provide timely repairs
- Make Informed Decisions: Understand full network needs
- Plan Ahead: Accurately predict budgets
- Save Money: Minimize cost, maximize value
- **Defend Budgets:** Communicating needs effectively = \$

• Apply the right treatments at the right place at the right time





### **Pavement Deterioration**

- Stay ahead of the curve
- Apply the right treatment at the right place at the right time



### **Pavement Management Basics**

What do I How much is it going to cost? have? • • • What work do I What condition need to do? is it in? When do I need to do work?

### What Do I Have?

- Define the pavement network
- Network segmentation
- Historical records review
  - Past deterioration helps predict future deterioration





### What Condition Is It In?

- Field inspections
  - Objective visual assessment
  - Overall condition & distress identification
- Several data collection options
- Inspect on regular basis





What work do I meed to do? When do I need to do work?

### When Do I Need To Do Work?

- Deterioration modeling
- Critical thresholds
- Prioritization strategies





### What Work Do I Need To Do?





### How Much Is It Going To Cost?

- Explore budget strategies
- Consequence of deferral
- Planning & optimization







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### **Data Collection: Distress Identification**

- Indicates mechanism of distress development
- Guide specific treatments



### **Data Collection: Common Distresses**



Alligator Cracking



Alligator Cracking



LT Cracking

### **Data Collection: Common Distresses**



Weathering



Raveling

### **Data Collection Methods Comparison**

Inspection Method	Complexity	Cost	Speed	Data Quality	Challenges
Field Inspection (PCI)	Medium	\$\$	Slow	$\checkmark \checkmark \checkmark$	<ul><li>Network coverage</li><li>Safety &amp; access</li></ul>
Windshield (Visual or A.I.)	Low	\$	Fast	$\checkmark$	Data quality
Automated Collection Vans	Low to High	\$ to \$\$\$	Fast	✓ to ✓ ✓ ✓	<ul> <li>New technology</li> </ul>
Drone/UAS	High	\$\$\$	Fast	$\checkmark \checkmark$	<ul><li>FAA regulations</li><li>Unproven workflow</li></ul>

### **Data Collection Methods Comparison**



Field Inspection (PCI)



#### Windshield (A.I.)

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### **Data Collection Methods Comparison**



Automated Collection Vans



#### Drone/UAS

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### Data Collection: Windshield A.I. + Field QC

#### Phase 1: Windshield A.I. Survey

STEP 1



Collect data using dashboard camera



Deep learning analyzes the data and automatically generates the assessment

STEP 3



The assessment is reviewed in GIS platform as Shapefile, with imagery at 10' increments

#### Phase 2: ASTM PCI





Review full roadway network and initially convert RB values to PCI using IDI data.



Develop a focused and representative pavement condition sampling plan.



Confirm condition rating and collect details to support project planning

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### "Patch's" Pavement Treatment Quiz Game

Squawk! This street could use some maintenance!







#### February 2019



#### Kimley»<mark>Horn</mark>









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### **Data Analysis**



#### **Pavement Conditions**

### **Analysis & Planning Softwares - PAVER**



### **DRIVE** - <u>D</u>atabase for <u>R</u>oadway <u>Inventory</u> <u>V</u>isualization and <u>E</u>valuation



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### **DRIVE Cost-Benefit Evaluation Approach**

How do I pick projects with a limited budget?

#### **Typical Pavement Management Software**

- Budget Optimization
- Critical Condition
- Forecasted PCI

#### **DRIVE Cost-Benefit Value (CBV) Evaluation**

- Traffic Volume
- Road Rank
- Forecasted PCI
- Critical Limit per Treatment
- Treatment Cost
- Treatment Life Extension
- Consequence of Deferral



### **Questions?**

## Kevin Stone, P.E. kevin.stone@kimley-horn.com 407-412-7809 189 S Orange Ave, Suite 1000, Orlando, FL 32801 THANK YOU FOR YOUR TIME! **Kimley**»Horn Expect More. Experience Better.

Check out Kimley-Horn's DRIVE web page!

→ <u>https://www.kimley-horn.com/solutions/asset-management/drive/</u>

or simply search for "Kimley-Horn DRIVE"

