HEEP Mission Statement

The Highway Engineering Exchange Program (HEEP) is an international organization that promotes advances in transportation engineering through the exchange of knowledge and information technology.
Kentucky Geographics/Demographics

- 104,695 km$^2$ (40,400 mi$^2$) in area [37$^{th}$ largest]
- 4.436 million people [26$^{th}$ most]
- 120 Counties
- 12 Highway Districts
Topography

Photo Credit: Bill Griffin
Organization Structure – Central Office

Division of Maintenance

Operations and Pavement Management Branch
- Pavement Data Collection and Analysis
- Operations (ITS)

Bridge Preservation Branch
- Bridge Inspection
- Underwater Inspection
- Fracture Critical
- Tunnel Inspection
- Bridge Preservation

Roadway Maintenance Branch
- Routine Maintenance

Roadside Maintenance Branch
- Agronomy
- Snow & Ice
District Office Re-Organization

- Each county has a Maintenance facility and staffing
- Combined Maintenance and Construction to form Project Delivery & Preservation
- Responsible for “minor” Maintenance activities
Road Assets

• 44,448 km of paved roadways [eq. to 102,232 km lanes] and valued at $60 billion
  ▪ Interstate (Motorway) [Appx. 1,357 km]
  ▪ Parkway System [Appx. 925 km]
  ▪ MP (State Primary, State Secondary & Supplemental Roads) [Appx. 21,648 km]
  ▪ Rural Secondary (22.2% Road Fund) [Appx. 20,551 km]
  ▪ No Toll Roads - 2 bridges (Appx. $3.00 per crossing)
Road Assets

Interstate 65

State/Rural Secondary
Bridge Assets

• Appx. 15,000 Bridges (structures over 6 meters)
  ▪ Appx. 400 are considered “major” (over 152 meters length)
  ▪ Mix of state and local owned structures
  ▪ Agreement with neighbor States

• Tunnels
  ▪ 5 under State Inspection and Maintenance
  ▪ Longest is 518 m
Misc. Assets

• 24 active Rest Areas (privately operated on contract)

• ITS and Traffic Cameras

• Weigh Stations
Maintenance Funding

- Mix of Federal Match and Road Fund $$$
  - Gas Tax (22.5-31 cents per gallon)
  - Registration and Licensing Fees

- Federal Bridge Replacement Program (BRO, BRX, BRZ)

- Pavement Rehabilitation on NHS
Routine Maintenance

• Categories
  ▪ A: Mainline Pavement Patching (potholes)
  ▪ B: Shoulder Repair
  ▪ C: Roadside (guardrail repair, litter, dead animals, etc.)
  ▪ D: Drainage (ditching, pipe/catch-basin cleanout or replacement)
  ▪ E: Agronomy
  ▪ K: Snow and Ice (also Operational)
  ▪ T: Pavement Striping

• Mostly State Funded ($275 million annually)

• Some work handled by State Forces
Routine Maintenance

• Master Agreements
  ▪ Multiple Contractors by District Grouping
  ▪ Open-ended contract to supply materials and labor
  ▪ Less variance in scope of work

• Traditional Contract Procurement (Low Bid)
Routine Maintenance

• Maintenance Standards Guide (Maintenance Manual)

• Regularly spend more or less depending on health of the Road Fund
Routine Maintenance

• Appx. $100 Million Annually on Resurfacing
  ▪ Equates to 974 centerline km
  ▪ 17-18 year resurfacing cycle

• Appx. $2 million annually on new guardrail
  ▪ $1 million from Maintenance funds
  ▪ $1 million match from HSIP
  ▪ Traditional Contract Procurement
  ▪ Additional Work (slope stabilization)
Non-Scheduled Routine Maintenance

• Identified by District/County Maintenance Employees

• Identified by roving contractors

• Submitted by citizen through website
Routine Maintenance Issues
Routine Maintenance Issues
Routine Maintenance Issues
Snow & Ice Removal
Snow & Ice Removal
Routine Maintenance KPIs and LOS

- Maintenance Rating Program (MRP)
  - Random inspection
  - Visual or Manual Measurement
  - Yearly Sampling
Routine Maintenance KPIs and LOS

- Maintenance Rating Program (MRP)
  - Report helps guide spending
  - Performance Measures
Routine Maintenance KPIs and LOS

Figure 2: District Maintenance Levels of Service
Structural Maintenance

• Pavement Rehabilitation
  ▪ Mill & Fill (Milling and surface overlay)
  ▪ Mill & Intermediate Overlay (additional base course)
  ▪ JPC Repair & Diamond Grinding (Patching)
  ▪ Remove & Replace JPC
  ▪ Average of $150 million per year
  ▪ Must be on NHS
Structural Maintenance

- Bridge Maintenance
  - Funded through Federal Trans. Bill
  - Inspected every other year
  - Underwater Inspection every 5 years
  - Fracture Critical required on 300 bridges
Structural Maintenance

- Maintenance Activities
  - Deck Repair
  - Joint Repair
  - Painting
  - Appx. $35 million annually

- Data Driven – AASHTO BrM
Emergency Structural Maintenance Issues
Emergency Structural Maintenance Issues
Emergency Structural Maintenance Issues
Asset Collection Vehicles

- 4 vehicle fleet (2 in operation)
- $400,000 each
- Data collection
  - Laser Crack Scanning
  - Rutting
  - Cross Slope
  - Intnl’ Roughness Index
  - Faulting
- Interstates & NHS (annually)
- Other Routes (biennially)
Photolog Viewer

- http://maps.kytc.ky.gov/photolog/
Pavement Distresses
Cracking allows moisture infiltration into the pavement thus causing further deterioration. Distresses can increase pavement roughness and create greater maintenance needs.

Roughness
Roughness is a measure of irregularities in the pavement surface that adversely affect the ride quality of the vehicle. This is quantified as the International Roughness Index (IRI). Higher values indicate rougher pavement on the scale.

Rutting
Rutting is a longitudinal surface depression in the wheel path of the pavement. Rutting often creates ponding of water and can be a safety concern.

Concrete Faulting
Faulting is a difference in elevation across a joint or crack in concrete pavement.
Performance Standards (Pavement)

**Good Pavement**
- Meets the “good” IRI threshold (0-80)
- Has a smooth ride
- Minor to no pavement distress
- Not in need of resurfacing

**Fair Pavement**
- Meets the “fair” IRI threshold (81-150)
- Moderately smooth ride
- Moderate pavement distresses
- May need pavement resurfacing within two to five years

**Poor Pavement**
- IRI exceeds “poor” threshold (151+)
- Pavement has rough ride
- Moderate to severe pavement distresses
- Needs resurfacing or rehabilitation within one year
Project Prioritization

- Joint Venture with University of Louisville
- Use Analytic Hierarchy Process (AHP)
Asset Management

Asset management is the strategic and systematic process of operating, maintaining, and improving physical assets, with a focus on engineering and economic analysis based upon quality information, to identify a structured sequence of maintenance, preservation, repair, rehabilitation, and replacement actions that will achieve and sustain a desired state of good repair over the lifecycle of the assets at minimum practicable cost.
Asset Management (TAM GAP)

• Transportation Asset Management Gap Analysis Plan

• Identified 5 Goals (multitude of sub-goals)
  
  ▪ Goal 1: Articulate an asset management framework with strategies and objectives to formalize and integrate the adoption of asset management as a way of doing business.

  ▪ Goal 2: Produce a risk-based asset management plan that establishes clear goals for performance and condition of infrastructure assets, linking treatments to budget allocations that achieve the desired state of good repair.

  ▪ Goal 3: Use measures such as asset sustainability ratio, deferred liability, and remaining service life to communicate the benefits of TAM and use financial forecasting and funds management to catalyze adequate investment.

  ▪ Goal 4: Formalize and implement systematic preservation and maintenance processes and update management systems to reflect these changes.

  ▪ Goal 5: Implement a comprehensive data management framework with data governance policies and procedures to support analysis needs and data driven risk-based asset management decisions.
Asset Management RFP

• Create a “risk-based” Management Plan

• Initial plan due 30-4-2018, final due 30-6-2019

• Professional Services contract (up to $500,000) for 2 years (mod 2 additional years)

• Awarded to Applied Pavement Technologies
Asset Management RFP

• Task 1 – Review of KYTC TAM Self-Assessment
• Task 2 – Gap Analysis
• Task 3 – Development of Plan
• Task 4 – Recommendations for Long Term TAMP Administration
• Task 5 – KYTC Leadership Workshop
• Task 6 – Quarterly Progress Reports
Asset Management RFP

• Task 3 – Development of Plan
  ▪ Summary listing and condition description of the NHS pavements and bridges
  ▪ NHS pavements and bridges targets
  ▪ Asset management objectives and measures
  ▪ Performance gap analysis
  ▪ Risk analysis
  ▪ Life-cycle planning
  ▪ Financial plan (minimum 10 years)
  ▪ Investment strategies
Questions?
2017 IHEEP Conference

September 24-28, 2017
Northern KY Convention Center
Covington, KY