Iowa Pavement Management Program: Overview

Asset Management Peer Exchange
ST Cloud, MN
Wednesday, May 17, 2017

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Program Coordinator
IPMP Mission

• Support of the MANAGEMENT, PLANNING, and PROGRAMMING needs of transportation agencies

• Provide pavement management information, tools, and training supporting both PROJECT level and NETWORK level activities
IPMP

- ISTEA Mandate (1991)
- Started in 1995
- 38,000 KM
- State, Counties and Cities
- Three Phase approach
MAJOR TASKS

• Database Design
• Pavement Management Data
• Pavement Management Software
• Information Delivery
• Training
• Implementation
IPMP DATA DELIVERY

Graphics and Data

Graphics Only

ODBC

dBase DBF

Data Only

ArcGIS

ESRI
Data collection Plan
Raw data
100% coverage

- Roughness (IRI) – left, right
- Rutting – left, right
- Alligator cracking – LMH
- Transverse cracking – LMH
- Longitudinal cracking – LMH
- Longitudinal wheelpath cracking - LMH
- Patch – good, bad
- Patch count
- Failure
- Bearing
- Durability cracking - count
- Joint spalling – count
- Faulting – total joints, faulted joints by wp
Pavement condition summary

- Roughness (IRI) – left, right
- Rutting – left, right
- Alligator cracking – LMH
- Transverse cracking – LMH
- Longitudinal cracking – LMH
- Longitudinal wheelpath cracking - LMH
- Patch – good, bad
- Patch count
- Failure
- Durability cracking - count
- Joint spalling – count
- Faulting – total joints, faulted joints by wp
Pavement condition summary
Complete condition data applied to both history sections. ACC specific distresses on PCC section (vice versa).

Missing condition data.
Pavement Condition Index (PCI)

- A combined condition index:
  - Road roughness (bumpiness)
  - Rutting
  - Cracking (transverse, longitudinal, alligator)
  - Patching
  - Faulting

- Calculated for **Asphalt, Composite, and Concrete** roads separately

- Scale of **0-100** with 100 being a new street
Pavement Condition Index (PCI)

• PCI Scale:

  • Very Poor = PCI 0-20
  • Poor = PCI 20-40
  • Fair = PCI 40-60
  • Good = PCI 60-80
  • Excellent = PCI 80-100
## PCI Calculation

### Asphalt Pavement

<table>
<thead>
<tr>
<th>Distress</th>
<th>Severity</th>
<th>Group Weight (%)</th>
<th>Total Weight (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IRI (ride)</td>
<td></td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td>Alligator Cracking Rutting</td>
<td>1x</td>
<td>40</td>
<td>20</td>
</tr>
<tr>
<td>Transverse Cracking</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Longitudinal Cracking (non-wheel path)</td>
<td>1x, 1.5x, 2x</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Longitudinal Cracking (wheel path)</td>
<td>1x, 1.5x, 2x</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
# PCI Calculation

## Concrete Pavement

<table>
<thead>
<tr>
<th>DISTRESS</th>
<th>SEVERITY</th>
<th>GROUP WEIGHT (%)</th>
<th>TOTAL WEIGHT (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IRI (ride)</td>
<td>LOW</td>
<td></td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>MODERATE</td>
<td></td>
<td>35</td>
</tr>
<tr>
<td></td>
<td>HIGH</td>
<td></td>
<td>35</td>
</tr>
<tr>
<td>&quot;D&quot; Cracking</td>
<td>1x</td>
<td>1x</td>
<td>40</td>
</tr>
<tr>
<td>Joint Spalling</td>
<td>1x</td>
<td>1x</td>
<td>25</td>
</tr>
<tr>
<td>Transverse Cracking</td>
<td>1.5x</td>
<td>2x</td>
<td>25</td>
</tr>
</tbody>
</table>
## PCI Calculation

### Composite Pavement

<table>
<thead>
<tr>
<th>DISTRESS</th>
<th>SEVERITY</th>
<th>GROUP WEIGHT (%)</th>
<th>TOTAL WEIGHT (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>IRI (ride)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>transverse cracking</td>
<td>LOW: 1x</td>
<td>35</td>
<td>35</td>
</tr>
<tr>
<td>longitudinal cracking</td>
<td>MODERATE:1.5x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>(non-wheel path)</td>
<td>HIGH: 2x</td>
<td></td>
<td></td>
</tr>
<tr>
<td>longitudinal cracking</td>
<td>LOW: 1x</td>
<td></td>
<td>20</td>
</tr>
<tr>
<td>(wheel path)</td>
<td>MODERATE:1.5x</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>HIGH: 2x</td>
<td></td>
<td>15</td>
</tr>
<tr>
<td>alligator cracking</td>
<td>LOW: 1x</td>
<td></td>
<td>7.5</td>
</tr>
<tr>
<td>patching</td>
<td>MODERATE:1x</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>HIGH: 2x</td>
<td></td>
<td>7.5</td>
</tr>
</tbody>
</table>
## PCI Calculation

### PCI_THRESHOLDS

<table>
<thead>
<tr>
<th>Pavement Type</th>
<th>Distress</th>
<th>New Thresholds</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>528 Feet Sections</td>
</tr>
<tr>
<td>Asphalt Pavements</td>
<td>IRI</td>
<td>253 in/mile</td>
</tr>
<tr>
<td></td>
<td>Rutting</td>
<td>0.59 in</td>
</tr>
<tr>
<td></td>
<td>Block Cracking</td>
<td>NA</td>
</tr>
<tr>
<td></td>
<td>Alligator Cracking</td>
<td>1040 sq.ft</td>
</tr>
<tr>
<td></td>
<td>Transverse Cracking</td>
<td>24 cracks</td>
</tr>
<tr>
<td></td>
<td>Longitudinal Cracking (non-wheel path)</td>
<td>158 ft</td>
</tr>
<tr>
<td></td>
<td>Longitudinal Cracking (wheel path)</td>
<td>158 ft</td>
</tr>
<tr>
<td>Composite Pavements</td>
<td>IRI</td>
<td>253 in/mile</td>
</tr>
<tr>
<td></td>
<td>Alligator Cracking</td>
<td>1040 sq.ft</td>
</tr>
<tr>
<td></td>
<td>Transverse Cracking</td>
<td>24 cracks</td>
</tr>
<tr>
<td></td>
<td>Longitudinal Cracking (non-wheel path)</td>
<td>158 ft</td>
</tr>
<tr>
<td></td>
<td>Longitudinal Cracking (wheel path)</td>
<td>158 ft</td>
</tr>
<tr>
<td></td>
<td>Patching</td>
<td>520 sq.ft</td>
</tr>
<tr>
<td>Concrete Pavements</td>
<td>IRI</td>
<td>253 in/mile</td>
</tr>
<tr>
<td></td>
<td>Transverse Cracking</td>
<td>14 cracks</td>
</tr>
<tr>
<td></td>
<td>D-Cracking</td>
<td>8 joints</td>
</tr>
<tr>
<td></td>
<td>Joint Spalling</td>
<td>9 joints</td>
</tr>
<tr>
<td></td>
<td>For PCI6, Use IRI</td>
<td>380</td>
</tr>
</tbody>
</table>
Data access and download

• To view the data
  – http://maps.ipmp.ctre.iastate.edu/arcgis/home/ OR
  – http://www.ctre.iastate.edu/ipmp/resources/

• For download
  – http://www.ctre.iastate.edu/ipmp/forms/
Right of Way Video log

Pathweb
Very Poor (PCI 0-20)
Poor (PCI 20-40)
Fair (PCI 40-60)
Good (PCI 60-80)
Excellent (PCI 80-100)
Using the PCI

- Historic data
  - Project selection- prioritization, ranking
- Forecasting
- Engaging stakeholders
- Treatments evaluation
What we offer

- Pavement management data
- PM Implementation
- Training and support
- PMS Software
Pavement management data

- Pavement condition summary
- Rawdata
- GIS Maps
- ROW Video
PM Implementation

- Integrating with historic data
- Presentation to stakeholders
- PM Software
- PM Program template
Training

- Training and support
  - Pavement management software
  - GIS Integration
  - On demand
Users Group

- Quarterly meetings
- Peer exchange
  - How are you using IPMP data?
  - How can we support you?
    - To what extent
  - Biggest challenges
  - Success stories
- dTIMS Setup Template and Support
  - Long range transportation plan
  - Project selection
  - Forecasting
  - Estimating investment levels
  - Engaging stakeholders
PMS Software

• dTIMS:
  – Multi-year Prioritization
  – Incremental Benefit Cost Analysis
  – Deterministic Performance Forecasting
  – Project Selection
  – Budget Analysis
• Implementation:
  – Data
  – Performance curves
  – Treatment strategies
  – Trigger limits
  – Improvements
  – Evaluation
Results:

- Recommended Projects (by year)
- Recommended Treatments (project & year)
- Overall Analysis Summaries:
  - Condition
  - Backlog
  - Treatment cost
  - Treatment length
dTIMS

DO NOTHING

$4M starting 2015

$7.6M starting 2015
Example Results

![Graph showing aav_XPCI performance over years from 2014 to 2023. The graph displays a downward trend with a significant increase at the year 2017.](image-url)
Example Results

PCI Comparison

- Replacement 2022
- Thin Overlay 2015
- Do-Nothing

Year
PCI
Questions?