Infrastructure Condition Evaluation (ICE) Tool

Office of Systems Planning
Freight Advisory Council
September 11, 2015
Presentation outline

- Project objective
- Data analysis & evaluation structure
- Planning report overview
- ICE webtool demo
- Annual timeline & future enhancements
- Applications
Infrastructure Condition Evaluation (ICE) objectives

• Evaluate the entire Primary Highway System, independent of current financial constraints, using a select group of criteria weighted in terms of relative significance.
  
  • Will provide the department with an initial screening and prioritization of Primary highway corridors.
  
  • These corridors would then represent those areas that could be considered for further study and possible programming.
Data analysis

• Multiple datasets, available in Oracle Spatial
  – Geographic Information Management System (GIMS)
    • Traffic Counts, Structure Sufficiency Rating, Boundaries, etc.
  – Pavement Management Information System (PMIS)
    • PCI & IRI
  – Data provided for all roadway directions (dual segment)
• Linear Referencing Systems (LRS)
• Linear Overlay process
• Structured Query Language (SQL)
Evaluation structure

- Seven evaluation criteria (next slide)
- Normalized to common scale (1-10)
- Determined appropriate weighting (percentage)
- Applied corresponding multipliers
- Maximum composite score = 100
- Low score indicates poorer conditions
Evaluation criteria

- Pavement Condition Index (PCI) 25%
- Structure Sufficiency Rating 25%
- International Roughness Index (IRI) 15%
- Combination Truck AADT 15%
- Single-Unit Truck AADT 5%
- Passenger AADT 5%
- Congestion (V/C) 10%

100%
Corridor breakouts

Corridors segmented at:

1) Interstate
2) NHS routes
3) City with a population of 20,000 or greater (consistent with CIN definition)
4) Transition from two-lanes to four-lanes or vice versa
5) Duplicate routes (appropriate precedence assigned)

ICE Corridors by route type

<table>
<thead>
<tr>
<th>Route system</th>
<th>Number of corridors</th>
</tr>
</thead>
<tbody>
<tr>
<td>NHS</td>
<td>122</td>
</tr>
<tr>
<td>Interstate</td>
<td>21</td>
</tr>
<tr>
<td>Non-interstate divided</td>
<td>39</td>
</tr>
<tr>
<td>Non-divided</td>
<td>62</td>
</tr>
<tr>
<td>Non-NHS</td>
<td>161</td>
</tr>
<tr>
<td>Divided</td>
<td>3</td>
</tr>
<tr>
<td>Non-divided</td>
<td>158</td>
</tr>
<tr>
<td>Total</td>
<td>283</td>
</tr>
</tbody>
</table>
Highway Planning Report

IOWA INFRASTRUCTURE CONDITION EVALUATION

2014-2015 HIGHWAY PLANNING REPORT
### Table summaries

- Corridors summarized by ICE rating and individual criteria
- Also, District and system-level summaries

<table>
<thead>
<tr>
<th>RANK</th>
<th>CORRIDOR</th>
<th>ROUTE TYPE</th>
<th>ICE RATING</th>
<th>ALL</th>
<th>N/E</th>
<th>S/W</th>
<th>PCI</th>
<th>IRI</th>
<th>SUFF</th>
<th>PASS AADT</th>
<th>SINGLE AADT</th>
<th>COMBO AADT</th>
<th>V/C</th>
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<tbody>
<tr>
<td>46</td>
<td>IA 4 (jct of IA 144 to jct of IA 141)</td>
<td>ND</td>
<td>69.29</td>
<td>-</td>
<td>-</td>
<td>5</td>
<td>3</td>
<td>9</td>
<td>8</td>
<td>7</td>
<td>9</td>
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<tr>
<td>47</td>
<td>IA 17 (jct of US 20 to jct of IA 3)</td>
<td>ND</td>
<td>69.34</td>
<td>-</td>
<td>-</td>
<td>7</td>
<td>5</td>
<td>10</td>
<td>7</td>
<td>6</td>
<td>3</td>
<td>9</td>
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<tr>
<td>48</td>
<td>IA 5 (jct of IA 5/US 65 to jct of I-35)</td>
<td>D</td>
<td>69.40</td>
<td>69.13</td>
<td>69.66</td>
<td>8</td>
<td>6</td>
<td>10</td>
<td>2</td>
<td>3</td>
<td>5</td>
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<td>49</td>
<td>IA 13 (jct of E16 in Central City to east jct of IA 3/IA 13)</td>
<td>ND</td>
<td>69.46</td>
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<td>-</td>
<td>7</td>
<td>4</td>
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<tr>
<td>50</td>
<td>I-35 (east jct of I-80/I-235 to jct of US 30)</td>
<td>I</td>
<td>69.56</td>
<td>69.26</td>
<td>69.85</td>
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<td>51</td>
<td>IA 92 (east jct of IA5/IA 92 to north jct of IA 1)</td>
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<td>-</td>
<td>-</td>
<td>6</td>
<td>4</td>
<td>10</td>
<td>7</td>
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<td>7</td>
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<tr>
<td>52</td>
<td>IA 2 (jct of US 65 to jct of IA 5)</td>
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<td>-</td>
<td>-</td>
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<tr>
<td>53</td>
<td>IA 141 (jct of US 71 to jct of US 59)</td>
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<td>-</td>
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<td>7</td>
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<td>9</td>
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<tr>
<td>54</td>
<td>US 65 (west jct of US 34/US 65 to beginning of non-divided near Indianola)</td>
<td>ND</td>
<td>69.68</td>
<td>-</td>
<td>-</td>
<td>6</td>
<td>4</td>
<td>10</td>
<td>6</td>
<td>6</td>
<td>7</td>
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<td>9</td>
</tr>
</tbody>
</table>
Map summaries

- Statewide and individual District maps
- Displayed by divided and non-divided

ICE Rating

- Less Than 60
- 60 to Less Than 70
- 70 to Less Than 80
- 80 to Less Than 90
- 90 or Greater
ICE webtool demo
Timeline & future enhancements

Annual update cycle
- Internal stakeholder outreach
- Conduct linear overlay and re-run data analysis
- Annual ICE planning report by end of calendar year

Potential Enhancements
- Forecast future conditions
- Incorporate possible safety, operations, environmental components
- Trend analysis in report and through ICE dashboard
Additional applications

- State Freight Plan
  - “VCAP” project evaluation matrix
  - Examines:
    - iTRAM statewide truck VHT impact (value)
    - ICE ratings (condition)
    - INRIX travel speed/bottlenecks (performance)

- Transportation Systems Management & Ops (TSMO) Plan
  - ICE-OPS: Using ICE-like evaluation structure, tailored to operations
  - Bottlenecks, incident frequency, crash rate, planning time index, major event locations, weather-sensitive corridors, & ICE
Evaluation strengths

- Flexible tool that allows for quick custom analysis
- Easy access to all input data and processed output data
- Provides a single composite rating for all Primary Highway System segments, in addition to individual criteria
- Evaluation results easily summarized in table and map form, consumed via web-based tool
- Useful input to DOT decision-making process
Questions?

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