CASE STUDY:
RIGID PAVEMENTS IRI SPECIFICATION,
FIRST EXPERIENCE IN COSTA RICA

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OUTLINE

Costa Rica
- Description

LanammeUCR
- Background

IRI application in Costa Rica
- Specifications
- Projects

Case Study
- Project Description
- IRI specification
- Results
- Conclusions
COSTA RICA

• Located in Central America
• Area: 52,000 km²
• 4,000,000 people
• No army since 1948
• 2.5 million tourists in 2014
National Laboratory of Materials and Structural Models of the University of Costa Rica
• CR 2010 National Specificacion Manual
  – Since 2011

- Same IRI values for Flexible and Rigid Pavement
- Individual values: 3.0 m/km
- Data average: 1.85 m/km
- Simple moving average (SMA)

<table>
<thead>
<tr>
<th>% (m/km)</th>
<th>Surface Layer</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Road type</td>
</tr>
<tr>
<td></td>
<td>Highways and concessioned roads</td>
</tr>
<tr>
<td>50</td>
<td>&lt; 1.5</td>
</tr>
<tr>
<td>80</td>
<td>&lt; 1.8</td>
</tr>
<tr>
<td>100</td>
<td>&lt; 2.0</td>
</tr>
</tbody>
</table>
Flexible pavements

Route 18
Max. value 3.0 m/km

Route 21
Max. value 2.5 m/km

Route 23
SMA, less than 2.0 m/km
Individual values 3.0 m/km

Route 04
SMA, less than 1.5 m/km
Individual values 2.0 m/km

PROJECTS IN COSTA RICA
• 30.4mi (50 km)
• Four lines
• Rigid pavement
CASE STUDY
IRI Specification

Payment factor

Individual values: 2.0 m/km

SMA (5 individual values)

<table>
<thead>
<tr>
<th>IRI (m/km) ASTM E 70</th>
<th>Fines (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.5 &gt; IRI</td>
<td>0</td>
</tr>
<tr>
<td>1.5 ≤ IRI &lt; 1.75</td>
<td>5</td>
</tr>
<tr>
<td>1.75 ≤ IRI &lt; 2.0</td>
<td>10</td>
</tr>
<tr>
<td>2.0 ≤ IRI &lt; 2.5</td>
<td>20</td>
</tr>
<tr>
<td>2.5 ≤ IRI</td>
<td>40</td>
</tr>
</tbody>
</table>
• **Objective:** Obtain the IRI value and contrast it with the IRI specification for the compliance level and application of fines:
  – Analysis 1: Regular sections
  – Analysis 2: Repaired sections (diamond grinding)
• 396 sections of 200 m
• Approximately 79.2 km (39.6% of total project length).

<table>
<thead>
<tr>
<th>Fine (%)</th>
<th>Sections of 200m</th>
<th>Project section (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>10</td>
<td>64</td>
<td>16.16</td>
</tr>
<tr>
<td>20</td>
<td>258</td>
<td>65.15</td>
</tr>
<tr>
<td>40</td>
<td>74</td>
<td>18.69</td>
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</tbody>
</table>
• 55 sections of 200 m, sections with initial high roughness values where a diamond grinding technique was applied
• Approximately 11.0 km (5.5% of total project length)
<table>
<thead>
<tr>
<th>Fine (%)</th>
<th>Sections of 200m</th>
<th>Project section (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>5</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>10</td>
<td>2</td>
<td>3.6</td>
</tr>
<tr>
<td>20</td>
<td>19</td>
<td>34.5</td>
</tr>
<tr>
<td>40</td>
<td>34</td>
<td>61.8</td>
</tr>
</tbody>
</table>

CASE STUDY Analysis 2

- 10% fine: 4%
- 20% fine: 34%
- 40% fine: 62%
In the analyzed sections of the project, it was obtained high percentages of fines:

- 27.7% of the sections have a fine of 20% and 10.8% of 40%.

No decrease were observed in the percentage of fines in sections of the project with initial high roughness values where a diamond grinding technique was applied.
• Is the IRI specification too strict to be applied in a rigid pavement compared to a flexible pavement?

• Is the IRI value a quality acceptance or a pay parameter?
Thank You

Questions?

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