City of Houston – Street
Surface Assessment Vehicle Overview
Presented – June 1, 2012
Typical Roadway Conditions

- Slab/Panel Replacement
- Concrete Cracks
- Joint Seal
- Longitudinal Cracking
Projects and maintenance decisions

PCR score that can aid in prioritizing future capital

- Other various street conditions
  - Cracking
  - Rutting
  - Roughness

Customizable PCR score range utilizing specific street conditions

GIS integration

Data accessible to multiple viewers & the public

Non-subjective process for pavement rating

Efficient assessment of roadways in a timely manner

Alternative Solution

Goals Identified for an
Assessments

Estimated 5-year initial system life

Major thoroughfares to be assessed annually

Assessments are anticipated to occur every 2 years

Full production began May 2010

Begun testing July 2009

Utilization and coordination of various technologies housed in a mobile unit

The Street Surface Assessment Vehicle (SSAV)

Development of a Solution

Partnership with Idea Integration, Inc. to develop

Texas DOT Logo

City of Houston Logo
How Does it Work?
Street Condition Assessment Vehicle

Technical Components of the

- Road Profiler
- Instrument Measuring Distance
- Accelerometer (inside van)
- GPS Unit
- 360 Degree Camera
- Crackscope
Accelerometer: This device tracks the speed of the vehicle and the extent of cracking on the pavement.

Processing software automatically detects the severity of cracks. The vehicle is outfitted above the rear tires with a high-resolution camera system called Crackscope. It takes images that are analyzed by post-processing software to determine the severity of cracks.

Line Scan Camera System: The vehicle is equipped with a line-scan camera system that captures the roughness of the road. Accelerometers that are used to capture the roughness of the road.

Road Profiler: The Road Profiler is mounted on the front bumper of the vehicle. It contains three lasers and two sensors.
position of the vehicle. Post processing to the components together and calculate the instrument (device). The data from these instruments is used in Trimble GPS receiver and a DMI (Distance Measurement) device. The vehicle is equipped with a GPS and DMI Devices.

View technology: While viewing the right-of-way, this is similar to the Google Street van. The video produced allows the user to pan in all directions and is mounted on a mechanical arm that extends above the second camera ball with 1 camera taking 30 frames per second. 360° Video: A camera ball with 1 camera taking 30 frames per second.
PCR point deduction
Each category is weighted by a maximum possible
each of the lanes driven in the segment
average PCR score for the most recent run of
The final PCR score for a road segment is the
Low, medium and high severity cracking
The Total Crackings Deduction is a combination of Crackings Deduction
PCR = 100 - (Rutting Deduction + IRI Deduction + Total)
Calculated according to the following formula:
The Pavement Condition Rating (PCR) is
How the Score Is
A PCR score of 30 is the lowest possible score for any segment able to be traveled over by the SSAY.

- Widths < 6mm in one area.
- Medium (up to 8 pts.) = AVG length of cracks per sq. meter. Medium (up to 8 pts.) = AVG length of cracks per sq. meter.
- High (up to 12 pts.) = AVG length of cracks per sq. meter.
- Medium (up to 8 pts.) = AVG length of cracks per sq. meter.
- Low (up to 5 pts.) = AVG length of cracks per sq. meter.

Following cracking categories:
- Crackling – Up to 25 points deducted based on the length of cracks
- Irregular (Roughness) – Up to 30 points deducted
- Rutting – Up to 15 points deducted

How the score is calculated:

There is a maximum deduction of 70 points per street segment.
Did not identify or "asset tag" any items

(Miles)

Measured distance traveled only (centerline)

Assessed

Standing water can cover pavement

Assessed

Clear weather is needed for accurate

The Obstacles Identified
Future:

- CoHGS Roads
- Other system improvements
- Ground-penetrating radar
- Roadway width calculations
- Asset Tagging
- Upgrades (costs vary)
Supplemental Data For All Streets:

<table>
<thead>
<tr>
<th>Season</th>
<th>PCR Score Distribution</th>
<th>Frequency Distribution</th>
</tr>
</thead>
<tbody>
<tr>
<td>10.00%</td>
<td>% of Total</td>
<td>%</td>
</tr>
<tr>
<td>100</td>
<td>78.08</td>
<td>35</td>
</tr>
<tr>
<td>20.00%</td>
<td>78.07</td>
<td>47</td>
</tr>
<tr>
<td>40.00%</td>
<td>71.69</td>
<td>54</td>
</tr>
<tr>
<td>20.00%</td>
<td>64.63</td>
<td>57</td>
</tr>
<tr>
<td>10.00%</td>
<td>58.65</td>
<td>61</td>
</tr>
</tbody>
</table>

Mean PCR score: 67.50
Minimum PCR score recorded: 35
Maximum PCR score recorded: 100

Over 66,000 street segments analyzed.

Examining the Results.