Innovations in Rating Systems and Performance Management Indices

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Outline

- Background
- NTTA Asset Management
- NTTA Roadway Management Activities
 - Network condition monitoring
 - Performance modeling
 - M&R Programming
- Maintenance Rating Program
- GASB 34 Compliance
- Roadway Index

NTTA Network



Facility Map of the North Texas Region



NTTA Growth

System Size



Year

Interesting Facts

Currently 111 center-line miles

• 850 Lane Miles

Traffic

- System Wide ADT of 1.2 Million
- System Wide Daily VMT of 8 Million
- Toll Revenues
 - ~\$450 Million





NTTA Asset Management

- Fully implemented asset management plan
- Four asset categories
 - Roadways
 - Bridges
 - Buildings
 - Fleets
- **Regular** monitoring
- Maintenance Rating Program (MRP)
- **Computerized systems**
- GASB 34 compliance
- Annual M&R programming



NTTA Roadway Management

- Annual Network Monitoring
 - Digital survey vehicle inspections
 - Surface distress
 - Rutting / joint faulting
 - >Rideability IRI
 - Skid Testing
 - RWD Deflection Testing (New)
- Condition assessment
- Performance modeling
- Remaining service life (RSL)
- Multi-year M&R planning
- Project-level evaluation & design







Condition Assessment - CRS

- Condition Rating Survey (CRS) methodology
 - Developed for major highways; used by NTTA, ISTHA, HCTRA, and FBCTRA
 - CRCP, Jointed PCC, and HMA pavements
- CRS = f (surface distress, IRI, rutting / faulting)
 - Distress severity
 - Relative frequency
- Easy-to-use, expedient
- 100% of pavement evaluated
- Rating scale: 1 to 9

CRS Rating	General Pavement Condition	
9.0 to 7.6	Excellent	
7.1 to 7.5	Good	
6.6 to 7.0	Fair	
6.0 to 6.5	Poor	
5.9 to 1.0	Failed	

Performance Modeling

Future CRS = f (current CRS, ESALs, pavement type/thickness)



Remaining Service Life (RSL)

RSL = time to reach trigger for major rehabilitation (CRS = 6.5)



Year

M&R Programming

- Pavement maintenance & rehabilitation plan
 - 10-year plan
 - Updated annually
- NTTA Pavement Strategies
 - New Pavement
 - ≻ CRCP (12-13 inches)
 - Moisture treated subgrade
 - Maintenance & Rehabilitation
 - >Aggressive joint & crack sealing
 - > Skidabrader / diamond grinding
 - Micro-surfacing
 - HMA overlays



Maintenance Rating Program (MRP)

- Scorecard for maintenance activities
 - Measures level of service against NTTA-established criteria
 - Focus on maintenance versus condition (e.g., are cracks sealed versus presence of cracking)
 - MRP Rating = % samples passing criteria
 - 0 to 100 rating scale
- MRP categories for roadway include:
 - Travel lanes & shoulders
 - Roadside (culverts, ditches, inlets, vegetation)
 - Other (pavement markings signs, guardrail, etc)
- First used on privatized maintenance contract on PGBT
- Now used network wide



NTTA Roadway Index

- Assesses health of the NTTA roadway network
- Health is function of:
 - Current condition → CRS Rating
 - Future prognosis \rightarrow RSL
 - Level of care → MRP Rating



NTTA Roadway Index

- Used to demonstrate compliance with GASB 34 requirements
- First implemented in 2002
- Subsequently modified
- Describes the overall health of the NTTA roadway network
- Rating Scale
 - 1 to 10 scale (10 = excellent)
 - Working goal = 8.0; floor goal = 6.0

Roadway Index Equation

Roadway Index = $[(A \times CRS) + (B \times RSL) + (C \times MRP)] / 10$

where,

- CRS = Current CRS [max. of 8.5] / 8.5) * 100 RSL = (RSL [max. of 15 yrs] / 15) * 100 MRP = Maintenance quality rating
- A, B, C = Weighting factors that sum 1.0

Weighting Factors

ltem	2002 Initial weightings	1 st modification 2005	2 nd modification 2006
Current condition (e.g., CRS)	0.56	0.56	0.50
Future Prognosis (e.g. RSL)	0.00	0.00	0.30
Level of Care (e.g., MRP)	0.44 TL = 0.14 RS = 0.15 Other = 0.15	0.44 TL = 0.20 RS = 0.16 Other = 0.08	0.20 TL = 0.10 RS = 0.05 Other = 0.
TOTAL	1.00	1.00	1.00

Post 2006: Continued evaluation of weighting factors with de-emphasis of MRP

Summary

- NTTA embraces proactive asset management for its expanding roadway network
 - Regular monitoring of assets
 - GASB 34 Modified Approach
- Innovations and advanced technologies to manage pavement assets:
 - Data collection equipment & processes
 - Performance modeling
 - Management Systems
- Monitoring and reporting of all factors impacting *health* of pavement network → condition, RSL, maintenance
- Customer focus that drives a pavement preservation approach