Ultra-Thin Pavement: A Rural Application In an Asset Management Model

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Roscommon County
Primary Road Funding Facts

195 Miles of Primary Road

- Primary MTF and Small Urban = **$2.2 million**
- Routine Maintenance Budget = **$1.5 million**
- Construction and Rehabilitation = **$700,000**

Roscommon County Local Road Funding Facts

673 Miles of Local Road

- Local MTF and Small Urban = **$1.4 million**
- Routine Maintenance Budget = **$1.3 million**
- Construction and Rehabilitation = **$150,000**
- **$140,000** Match for Township Funds **($600,000)**

5 Year Federal Aid Program

SAFETEA-LU

- 125 Miles of Eligible Roadway

- Yearly Federal/State Allocation = $400,000
  20% local match is required

- System is currently behind $6,000,000
  Funding by approximately $6,000,000

- That number increases $600,000 per year

Program Guidelines

- New in 2009 Federal Funds can be used for Preventative Maintenance Type Fixes

- Overband Crack Filling
- One Course Non-Structural Overlays (1.5”)
- Single Course Chip Seals
- Double Chip Seals
- Single Course Micro Surfaces
- Ultra-Thin HMA Overlays
- Longitudinal HMA Wedging/Scratch Coats

Rating system

Surface rating	*Visible distress**	*General condition/ treatment measures*
10 Excellent	None.	New construction.
9 Excellent	None.	Recent overlay. Like new.
8 Very Good	No longitudinal cracks except reflection of paving joints. Occasional transverse cracks, widely spaced (40' or greater). All cracks sealed or tight (open less than ¼").	Recent sealcoat or new cold mix. Little or no maintenance required.
7 Good	Very slight or no raveling, surface shows some traffic wear. Longitudinal cracks (open ¼") due to reflection or paving joints. Transverse cracks (open ¼") spaced 10' or more apart, little or slight crack raveling. No patching or very few patches in excellent condition.	First signs of aging. Maintain with routine crack filling.
6 Good	Slight raveling (loss of fines) and traffic wear. Longitudinal cracks (open ¼"– ½"), some spaced less than 10'. First sign of block cracking. Sight to moderate flushing or polishing. Occasional patching in good condition.	Shows signs of aging. Sound structural condition. Could extend life with sealcoat.
5 Fair	Moderate to severe raveling (loss of fine and coarse aggregate). Longitudinal and transverse cracks (open ½") show first signs of slight raveling and secondary cracks. First signs of longitudinal cracks near pavement edge. Block cracking up to 50% of surface. Extensive to severe flushing or polishing. Some patching or edge wedging in good condition.	Surface aging. Sound structural condition. Needs sealcoat or thin non-structural overlay (less than 2")
4 Fair	Severe surface raveling. Multiple longitudinal and transverse cracking with slight raveling. Longitudinal cracking in wheel path. Block cracking (over 50% of surface). Patching in fair condition. Slight rutting or distortions (½" deep or less).	Significant aging and first signs of need for strengthening. Would benefit from a structural overlay (2" or more).
3 Poor	Closely spaced longitudinal and transverse cracks often showing raveling and crack erosion. Severe block cracking. Some alligator cracking (less than 25% of surface). Patches in fair to poor condition. Moderate rutting or distortion (1" or 2" deep). Occasional potholes.	Needs patching and repair prior to major overlay. Milling and removal of deterioration extends the life of overlay.
2 Very Poor	Alligator cracking (over 25% of surface). Severe distortions (over 2" deep) Extensive patching in poor condition. Potholes.	Severe deterioration. Needs reconstruction with extensive base repair. Pulverization of old pavement is effective.
1 Failed	Severe distress with extensive loss of surface integrity.	Failed. Needs total reconstruction.

** Individual pavements will not have all of the types of distress listed for any particular rating. They may have only one or two types.*

Asset Management

- Effective Management of Road Assets
- Right Fix at the Right Time
- Reproducible Scoring Standards
- Visible Pavement Distresses
- Condition and Budget Based Decisions
- Roadsoft Data Collection (Optimization)

Current Road Conditions

Roscommon County

- 2007 Primary Roads Rated 5.3 (Fair/Good)
  9% Rated Poor, 51% Rated Fair
  2003 Primary Roads Rated 6.4 (Good)
- 2003 Local Roads Rated 5.5 (Fair/Good)
  25% Rated Poor, 21% Rated Fair
  2009 Local Roads Rated ?
- $33,000,000 behind on Investment
- RCRC Cost/Condition based Plan

Mix of Fixes

- RCRC Historical Pricing Data
- Cost Effective Fixes
- Current PASER Ratings on All Roads
- “RSL” (Remaining Service Life)
- Optimization Plan (5 Year)

RCRC 6 Main Fix Types

Type of Fix	Approx. Cost	RSL Increase
Crack Sealing	$4,000/Mile	1 to 2
Dura-Patching	$8,500/Mile	2 to 3
Chip Sealing	$16,000/Mile	3 to 5
w/ wedging	$39,000/Mile	5 to 8
Ultra-Thin Paving (H)	$53,000/Mile	7 to 9
w/ wedging	$76,000/Mile	9 to 12
200# Overlay	$110,000/Mile	12 to 15
C/S w/220# Overlay	$195,000/Mile	20+

The RCRC Plan

- Focus on Crack Sealing all Roads Rated 6+ (Local and Primary)
- Focus on Dura-Patching all Roads Rated 4+ (Local and Primary)
- Identify which Roads are Candidates for Chip Sealing and or Ultra-Thin Paving
- Begin Wedging (1/4 Crown and or Failed Areas) In Preparation for future Resurfacing

Cont.

Summary of Cost Models

Low Volume Roads PASER Rated 1-5

CHIP-SEAL		**RSL**
Crack Seal	$4000	1
Dura-Patch	$8,500	2.5
Wedging	$23,000	2.5
	2.5	
Chip-Seal	$21,000	4
Total	$56,500	
Cost/Mi/Yr.	**$5,650**	**10**

ULTRA-THIN (H)		**RSL**
Crack Seal	$4,000	1
Dura-Patch	$8,500	2.5
Wedging	$23,000	
Ultra-Thin(H)	$53,000	8
Total	$88,500	
Cost/Mi/Yr.	**$6,320**	**14**

Cont.

Summary of Cost Models

Low Volume Roads PASER Rated 1-5

OVERLAY		RSL	C/S RESURFACE		RSL
Crack Seal	$4000	1	Crush/Shape	$195,000	20
Dura-Patch	$8,500	2.5	w/ Resurfacing		
Overlay	$110,000	13.5			
Total	$122,500		Total	$195,000	
Cost/Mi/Yr.	**$7,205**	**17**	**Cost/Mi/Yr.**	**$9,750**	**20**

Because of Past Chip Seal Problems,
Predominately Flushing and Stone Loss,
Politically it is a tough sell to use this
process in any Neighborhood Setting.

Ultra-Thin Tests

- W. Pleasant Street St. Helen, Mi., 2006
- Low Volume Local Road (200 ADT)
- Starting PASER rating of a 1*
- Original Design – Crush and Shape
- Estimated Cost of $53,000 for the ½ mile
- Ultra-Thin Alternative Proposed $20,000

W. Pleasant Construction

- ½ mile of Local Street 22’ wide pavement
- Minimal Prep Work
- Heavy Application of SS-1h Bond Coat
- Contractor Placed a “scratch course” (45#syd)
- Ultra-Thin (High Volume) Surface (65#syd)

W. Pleasant Construction Cont

- Density was achieved with the use of 2 standard paving rollers in static mode.
- Final Total Cost of the project was $23,000 including all Contractor and RCRC expenses
- Each Resident paid an equal share of $800
- The RCRC incurred NO cost and has cut it's Maintenance Cost by nearly $2,000/yr.

Current conditions

- W. Pleasant Street is now 3+ years old
- PASER Rating of a 9 (almost new)
- After Year 1, There was just 1 visible crack
- After Year 2, There was a second crack
- After Year 3, Some additional edge cracking
- We project that the first application of Crack Sealing may be warranted in year 5 or 6.

CR 105 (Russell Lake Rd.)

- 2009 the RCRC Partnered with Reith-Riley
- County Primary and Only Access to Plant/Pit
- PASER Rating was 4 (Poor/Fair)
- Some Severe Edge Cracking and Failure
- 2004 some ¼ crown wedging was completed
- 50/50 Cost Sharing Agreement
- RAP and Recycled Asphalt Shingle Test

CR 105 (Russell Lake Road) Cont

- CR 105 is 1.2 miles in length and 24’ wide
- Minimal Prep Work Needed
- A heavy application of SS-1h was applied
- ¼ Crown Wedging was completed
- 6/10 Mile both sides with RAP Added
- 6/10 Mile both sides with Shingles Added
- Summer Loading = 4200 Heavy Commercial
  2000 Medium Commercial
  6400 Light Commercial
- Overall ADT is 180 with about 60% Comm.

RCRC 5 Year Plan

Primary

- 1 Mile of Road Reconstruction per year
- 5 Miles of Ultra-Thin Paving per year
- 8 Miles of Chip Sealing per year
- 20 Miles of Crack Sealing per year
- 20 Miles of Dura-Patching per year
- Total Estimated Cost $600,000

RCRC 5 Year Plan

Local

- 0 Miles of Road Reconstruction per year
- 7 Miles of Ultra-thin Paving per year
- 6 Miles of Chip Sealing per year
- 30 Miles of Crack Sealing per year
- 30 Miles of Dura-Patching per year
- Total Estimated Cost $700,000

Conclusions:

- These are tough Financial Times for the Contractor and Owner.
- Local Agencies must stretch each dollar for maximum value until new funding is available and beyond
- You must become a Preventative Maintenance type Contractor.
- You must get involved during the planning process if you want to have an effect on where these limited Local dollars are spent.

Conclusions:

Cont

- You are competing with a well entrenched effective Contractor group that for the most part has a tried and true product to sell.
- You MUST be prepared to take a chance and get this product on your County's Roads.
- Road Commissions are Historically very conservative groups and for the most part NOT risk takers on new processes.

Thank You

Questions ?