

RAILROAD CROSSING SURFACE MATERIAL PERFORMANCE

Problem Statement:

The State of Michigan has large number of crossings with each type of surface, but there is a limited understanding on how each type has performed over time. Understanding performance over time is important, so that the most economical decisions can be made when determining crossing rehabilitations, or selecting materials for new crossings. Estimated Project Duration: Jan - Dec, 2013



Efficiency Through Engineering and Construction (ETEC) is a group of highly skilled Engineering and Construction students given real-world problems to solve. We strive to redefine and solve today's engineering challenges by maintaining efficiency, while also reducing social, and environmental impact.

Scope of Work:

Task in Original Scope	Gather crossing data from MDOT and other sources	Development of deterioration estimates and data analysis	Field visits to assess current crossing conditions	Provide recommendations on crossing surface	Develop guidelines for crossing surface evaluations	Disseminate the project outcomes
Details	Information was gathered from LTAP and other resources	Data not sufficient to develop trends	Field visits were completed over the summer.	MDOT data insufficient for analysis	Crossing surface evaluation and data collection program	Once the remaining tasks are completed and the final

Crossing Before Reconstruction



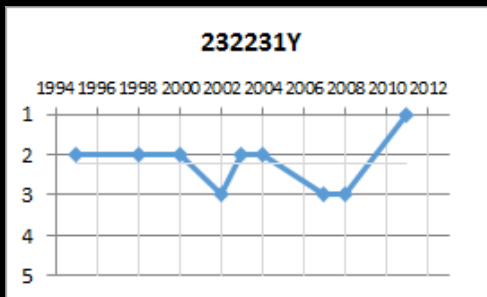
Crossing After Reconstruction



Rehab Section of Data Collection Sheet

Rehabilitation History Section+A1:F21		
	Date	Description
1) What rehabilitation was done to crossing? <i>Include Date of Rehabilitation</i>	Jun-02	Sectional asphalt patchwork
	Aug-08	Asphalt surface replaced by concrete panels
2) How was rehabilitation executed? <i>(if info is available)</i>		
3) Why was the crossing selected for rehabilitation? <i>(Mark one for each year)</i>		
	Year:	2002 2008
Routine Maintenance		X X
Request from MDOT		
Other <i>(specify)</i>		
<i>(If new project, record construction process and any issues)</i>		
Construction Notes: <i>(please note date)</i>		
	Date	Description
Drainage Notes: <i>(please note date)</i>	Jun-02	Patchwork done, did not examine drainage.
	Aug-08	Examined drainage, no change necessary.

Graph of Ratings vs Time



Potential Benefits:

- Improve surface/ride quality
- Longer maintenance intervals
- Reduce maintenance costs
- Improve durability
- Better understanding of surface performance
- Guidance on preferred surface types

Concrete Crossing Evaluation Sheet

Concrete		
1 - Excellent New Construction or Recent Reconstruction No Defects No Action Required	4 - Poor Severe cracking or joint faulting up to 1" Many joints, transverse, meander cracks open, severely spalled Extensive Patching in poor condition Occasional holes	
2 - Very Good Joints all in good condition Minor Surface defects - pop outs, map cracks Light Surface wear	Fasteners loose, projecting < 1/4" above surface Loose panels, no vertical displacement	
3 - Fair First signs of crack or joint faulting up to 1/4" First signs of joint or crack spalling Moderate to severe scaling or polishing 25-50% of surface Minor spalling from reinforcement Multiple corner cracks Fasteners loose, but not projecting above surface	5 - Very Poor Extensive and severely spalled cracks Extensive failed patches Joints failed Restricted speeds Loose panels, vertical displacements between panels, > 1/2" Loose fasteners, projecting > 1/4" above surface	

Project Advisors:

Lynn Artman – ETEC Advisor
Pasi Lautala – Rail Transportation Program, Director
David Nelson - Senior Research Engineer
Eric Peterson – Industry Expert

SPONSORS

