

Mn/DOT Work Zone ITS Contracts and Specification

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Presentation Outline

- Implementation of Dynamic Late Merge System
- Results of DLMS
- Qualified Products List Process
- Other Work Zone ITS Applications
- Contact Information

1) Identified an Existing Merging Problems

- Backups extend beyond the farthest advanced warning signs when motorists queue up in a single lane.
- Uneven speeds and traffic flow disruptions can lead to rear-end crashes.
- Erratic merging along the entire length of the traffic queue during congested conditions.
- Increased aggressive driving

This scenario commonly occurs during lane closures



Preferred Traffic Flow Utilizing Equal Lane Occupancy 2) Determine the proper type of strategy to solve the problem

- Reviewed other states experience with dynamic merging technologies such as Michigan, Kansas and Maryland.
- Decided to deploy a similar system that would provide the following:
 - guidance to motorists on proper lane usage
 - when traffic is free-flowing, the standard lane closure signage is adequate
 - When approaching congestion level, system activates message boards
- Received Federal Request to Experiment \$.

3) Developed specification and drawing

Mn/DOT Construction Office and Traffic Office worked closely with the vendor capable of providing the system.

Market research/focus group was used to test messages.

When congestion levels return to free-flow the PCMS's return to "dark mode" and motorists resume normal merging practices and safely merge based upon speed and traffic volume



Typical DLMS Setup

 Used In Addition to the Standard Traffic Control

• Easy Trailer Mounted PCMS Deployment

 PCMS only used during congested periods and remain Dark during freeflow conditions

1st Sign - Approximately 3 miles upstream



2nd Sign - 1.5 miles from Taper





3rd Sign – Located at Taper



Four DLMS Study Locations

Urban locations

- Hwy 10 in Anoka (2003)
- Hwy 494 in West Metro
- Hwy 52 at Lafayette Bridge

Rural location

I -35 from north of
 Faribault to Lakeville



Before and After Deployment



Findings and Results

- Lane occupancy increased everyday during congestion - reached near equal lane occupancy after short duration nearest the taper
- Queue lengths were reduced by 35-40%
- Crashes seem to be reduced (no real data collected)
- Less confusion and reduced aggressive driving observed via video tape review
- Travel time difference not significant
- Throughput dropped slightly (again limited data)

DLMS Acceptance

- Many positive comments from field project personnel, motorists and the media
 State Patrol has been very supportive
 Since the first deployments, many motorists
 - have requested that the system be utilized on more projects



Guidance on When to Use

Lane closures from 2 lanes down to 1

Hourly Volume exceeds 1500 vehicles for at least 2 hours per day

Lane Closure will be in place for at least three days

These guidelines are preliminary and will be adjusted with more experience

System Costs

Detection approximately \$300 per day 3 PCMS cost \$600 per day Total of \$900 per day per direction

Future use of Dynamic Merge

- Expanding the use of these systems on a couple of projects this construction season (2005).
- Including as a pay item in construction projects.
- Require the vendor to be on Qualified Product List (QPL).
- As vendors increase, cost should drop.

Institutionalizing Work Zone ITS

Need an easy way to incorporate needed ITS applications into construction projects.

- Mn/DOT Solution: Qualified Products List (QPL) based on Performance Specifications
 - Application
 - Basic Evaluation
 - Provisional Approval on QPL
 - Successful Deployment
 - Inclusion on QPL

Special Provisions Require system to be on the QPL and provide the following:

- System Requirements
- System Operation
- System Performance
- Training
- Warranty, Maintenance and Support
- Measurement and Payment (per day)

Intelligent Work Zone System

Component System - Detection, Communication, Messaging Travel Time System Dynamic Late Merge Advanced Congestion System Conflict Warning System - Excessive Speed Warning - Vehicle Entering Warning - Restricted Clearance Warning

Other Mn/DOT Work Zone ITS applications



Active Warning Systems



Advanced Congestion System





Work Zone Travel Time System I-494







Questions

Qualified Products Process www.dot.state.mn.us/trafficeng/designtools

DLMS Study Report Available Online www.dot.state.mn.us/trafficeng/workzone

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Work Zone Travel Time System in Minnesota

- ⇒ A Hybrid System combining RTMC and Vendor-provided Temporary Detection Systems through Internet
- ⇒ Provides Travel Times to the End of Work Zone every 30 seconds with Existing and Portable VMSs



Dynamic Late Merge System Active

