Intelligent Work Zones in Minnesota

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I WZ

- Intelligent Work Zones
  - ITS in Work Zones
  - Smart Work Zones
- Minnesota IWZ Toolbox
  - Terminology
  - Standardization
  - Brainstorming Tool
  - Considerations
  - Benefits
  - Always Changing – 3rd version soon
- ATSSA - ITS Safety & Mobility Solutions
  American Traffic Safety Services Association
- FHWA - Benefits of ITS in Work Zones
Past Deployments

- Slow Speed Advisory
Past Deployments

- Slow Speed Advisory
- Dynamic Late Merge
Past Deployments

- Slow Speed Advisory
- Dynamic Late Merge
- Travel Time / Delay
Past Deployments

- Slow Speed Advisory
- Dynamic Late Merge
- Travel Time / Delay
- Excessive Speed Warning
Past Deployments

- Slow Speed Advisory
- Dynamic Late Merge
- Travel Time / Delay
- Excessive Speed Warning
- Traffic Surveillance

Twin Cities’ Area:
- 320 CCTV Cameras
- 260 highway miles in Metro
- 85 Message Boards
Past Deployments

- Slow Speed Advisory
- Dynamic Late Merge
- Travel Time / Delay
- Excessive Speed Warning
- Traffic Surveillance
- Stopped Traffic Warning
Past Deployments

- Slow Speed Advisory
- Dynamic Late Merge
- Travel Time / Delay
- Excessive Speed Warning
- Traffic Surveillance
- Stopped Traffic Warning
- Trucks Entering / Exiting
Traffic Issues

- Sight Distance – Blind Curves
  - Need extra signage

- High Speed – High Volume Traffic
  - Traffic provides No Gaps
  - Stopping Traffic is Impractical and Unsafe

- Tailgating
  - Motorist following Trucks into Work Space
  - Panic Stops

The Motorist NEEDS MORE Information
Work Zone Issues

- Acceleration / Deceleration Lanes
  - Short or Non-existent

- Signage Indicating Merge / Exit Points
  - Signs give vague information
  - Messages left up 24 / 7

- Flagging Operations
  - Works best with low traffic and moderate trucks
  - Low trucks \(\rightarrow\) intermittent flagging
    - Proper rules are forgotten

- Information must be accurate and REAL TIME
Trucks vs. Traffic

Three examples of IWZ Solutions

- Trucks Entering & Exiting
- Trucks Crossing
- Snow Plowing Operations
Trucks Exiting Traffic

- CONSTRUCTION VEHICLE DO NOT FOLLOW
- De-Acceleration Lane
- NO De-Acceleration Lane
Truck Activated Caution Message

No De-acceleration Lane

Vehicle Detection System activates CMS warning on public roadway. System may be radio control devices operated by the truck drivers.

NOTE: Some temporary traffic control devices may have been omitted from this diagram for clarity purposes.
Trucks Entering Traffic

Acceleration Lane

HAUL ROAD

MERGING INTO TRAFFIC
Trucks Entering Traffic

NO Acceleration Lane

TURNING INTO TRAFFIC
IWZ System

Trucks Activate Signs

No Acceleration Lane

Vehicle Detection System activates CMS warning on public roadway. System may be radio control devices operated by the truck drivers.

HAUL ROAD

OR

Optional Signing

NOTE: Some temporary traffic control devices may have been omitted from this diagram for clarity purposes.

Wireless sensor location along haul road
Trucks Crossing Traffic

- Single Lane: Flagger Control
- Two Way Traffic: Duel Flagger Control
- Double Lane: Haul Road

STOP Sign

HAUL ROAD

Flagger Control

Duel Flagger Control

Two Way Traffic

Double Lane
IWZ System

Truck Actuated Portable Signals

Truck Actuated Message Sign

Crossing 2 Lane Roadway

Vehicle Detection System activates warning on public roadway. System may be radio control devices operated by the truck drivers.

Some temporary traffic control devices may have been omitted from this diagram for clarity purposes.
Combining IWZ Applications

- Application Messages vary in Urgency
  - General Information (travel time/delay)
  - Instructional Information (lane usage)
  - Hazard Warning (stopped traffic – flooded road)
  - Driver Warning (excessive speed – over-height)
  - TURN OFF when not needed

- Detection and Communication
  - Components can be utilized for multiple applications on the same project
  - Set priorities on the messages to be displayed
IWZ System

Plow Truck Activated
Caution Message

SECONDARY SYSTEM
Summary: Benefits

- Traffic Conflicts Reduced or Eliminated
  - Improved Operations
  - Fewer Incidents
- Flagging Reduced or Eliminated, Safer
- Messages to Motorists are REAL TIME
  - Increased Compliance
Information & Contact

- Minnesota IWZ Toolbox
  www.dot.state.mn.us/trafficeng/workzone/

- FHWA: ITS in Work Zones Info
  www.ops.fhwa.dot.gov/wz/its/

- ATSSA: ITS Solutions
  www.atssa.com/cs/intelligent_transportation_committee

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