

Late Merge (Zipper Merge) Traffic Accommodation Strategy for High Traffic Volume Work Zones along Provincial Highways

Summary

Alberta Transportation has recognized the late merge (zipper merge) as an effective traffic accommodation strategy for work zones when applied appropriately for the highway conditions. This Bulletin is issued to provide direction to practitioners and Department staff on when to use the late merge (zipper merge) strategy along Provincial highways.

Background

The nature of work zones and lane closures are such that some level of delay is inevitable. However, when used appropriately, certain lane closure and merging strategies are able to improve traffic flow, reduce delays, and increase safety.

Merge situations tend to generate speed differentials between the open and closed lanes. This may lead to aggressive driving maneuvers, including drivers using a nearly empty closed lane to pass queued vehicles, before darting back into the open lane just before the merge point. Aggressive driving can increase the probability of work zone collisions and road rage.

Generally, most drivers have learned that when they see the first lane closure signs in a work zone, they slow down and move to the lane that will continue through the construction area. This is not always the most efficient and safe way for traffic to merge. The best traffic merging strategy is based on the prevailing traffic conditions.

Early Merge Strategy

The early merge strategy is most effective when there are low traffic volumes on the road combined with high average speeds.

The early merge strategy instructs drivers to move out of the closed lane well before the forced merge point, and before traffic starts to backup.

Late Merge (Zipper Merge) Strategy

The late merge strategy is most effective when there are high traffic volumes on the road combined with low average speeds due to congestion.

The late merge strategy instructs drivers in the closed lane(s) to remain in their respective lane(s) until they reach the designated merge point, at which time they enter the open lane in alternate turns with the traffic already travelling in this lane.

Potential benefits of the implementation of a late merge strategy include the following:

- Reduced travel times
- Decreased number of work zone related incidents
- Reduced aggressive driving
- Increased traffic capacity through the work zone
- Shortened queue lengths before the work zone

The benefits derived from the use of a late merge strategy are most prevalent when traffic volumes are over the following thresholds:

- Rural highways: 1 000 vph for at least 2 hours per day
- Urban highways: 1 500 vph for at least 2 hours per day

At lower traffic volumes, the potential benefits decrease as drivers are likely to merge early irrespective of signing.

Key Changes and Implementation

A late merge traffic accommodation strategy shall be specified for use on all lane closures (long duration and short duration) for multi-lane highway work zones.

Examples include, but are not limited to, the following:

- Lane closures from 2 lanes to 1
- Lane closures from 3 lanes to 1

The layout shown on the attached drawing, “Typical Signing, One Lane Closure using Zipper Merge Signage Strategy, Four Lane Divided Highway”, shall be used as a reference when developing the zipper merge signage strategy for the project.

When appropriate, the following alternate messages may be displayed on the portable changeable message signs in place of that shown in Note 6 of the attached drawing:

- USE BOTH LANES / TO MERGE POINT
- STAY IN YOUR LANE / MERGE AHEAD
- USE BOTH LANES / SLOW TRAFFIC AHEAD

The following traffic accommodation drawings in the Traffic Accommodation in Work Zones (1st Edition 2008) are affected. These drawings will be modified when the next edition of the Traffic Accommodation in Work Zones manual is released.

Long Duration

- Drawing TCS-B-1.17B (Chip Seal Coating Operations)
- Drawing TCS-B-1.21B (Bridge Signing – Work Zone Speed > 60 km/h or Work Area > 300mm Drop)

- Drawing TCS-B-1.25B (Bridge Signing – Work Zone Speed \leq 60 km/h or Work Area < 300mm Drop)

Short Duration

- Drawing TCS-B-2.1B (One Lane Closure – Four Lane Divided Highway)
- Drawing TCS-B-2.4B (Centre and Right Lane Closure – Six Lane Divided Highway)
- Drawing TCS-B-2.5B (Right Lane Closure – Six Lane Divided Highway)
- Drawing TCS-B-2.8B (Temporary Detour Transition – Four Lane Divided Highway)

Effective Date

February 20, 2015

Attachment

Typical Zipper Merge Signage Layout

Contact

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Highway Operations Standards, Alberta Transportation

References

N/A

Recommended:

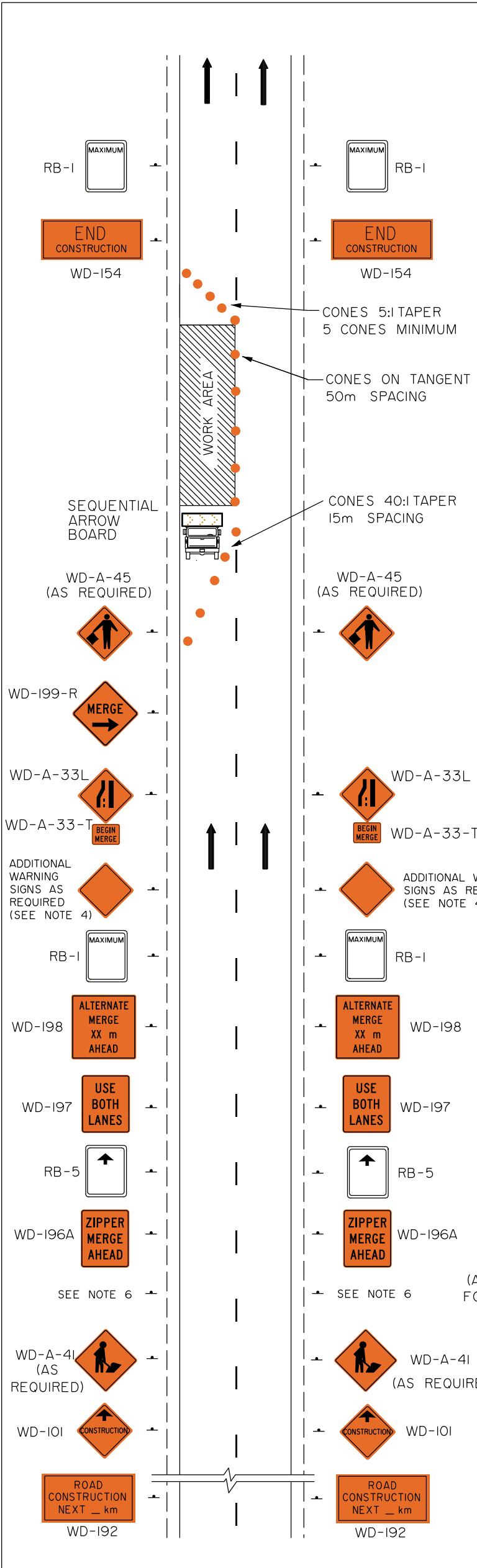
*Original signed
by Steve Otto*

Steve Otto
Director
Highway Operations Standards
Delivery Services

Approved:

*Original signed
by Moh Lali*

Moh Lali
Executive Director
Technical Standards Branch
Safety, Policy and Engineering



- NOTES:
1. Consideration must be given to traffic volume, sight distances, sign spacing, duration of work, night time conditions and other factors to ensure traffic control devices are adequate in each instance.
 2. All sign spacing shall be 100m-150m unless otherwise indicated.
 3. Speed limit and warning signs shall be placed after every intersecting roadway and shall be no more than 5km apart throughout the work zone where there is a restricted speed zone.
 4. Examples of additional warning signs that may be required in conjunction with this plan are:
 - LOOSE GRAVEL (WD-150)
 - GROOVED PAVEMENT (WD-A-III)
 - SHARP SHOULDERS (WD-A-100)
 - FRESH OIL (WD-157)
 5. Other hazard signs as shown in the schedule of signs may be used as required.
 6. Portable Changeable Message Signs
 - MERGE POINT X km USE BOTH LANES TO MERGE POINT
 7. WD-192 shall be erected 2km in advance of the project. Distance tab to include project length plus setback from project limit.
 8. For mobile operation, cones may not be required.

ZIPPER MERGE SIGNAGE LAYOUT

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△			
△			
No.	REVISIONS	BY	DATE
Approved:			
Executive Director, Technical Standards Branch			
Date:	JANUARY 2015		
TYPICAL SIGNING ONE LANE CLOSURE USING ZIPPER MERGE SIGNAGE STRATEGY FOUR LANE DIVIDED HIGHWAY			
Prepared By: S.L.	Checked By: R.C.	Scale: N.T.S.	Dwg No.: