

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

Summary

Alberta Transportation has recognized 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 guidance to practitioners and department staffs on the use of zipper merge along provincial highways.

Background

The nature of work zones and lane closures indicate that some delays are inevitable. However, certain lane closure and merging techniques are able to improve operations, reduce delays, and increase safety when used in appropriate situations.

Merging techniques tend to generate speed differentials between the open lane and the closed lane which can lead to aggressive driving maneuvers as vehicles use the nearly empty closed lane to pass queued vehicles before darting back into the open lane just before the merge point. This type of driving increases the probability of work zone collisions, road rage and aggressive driving.

In general practice, most drivers have learned when they see the first lane closed ahead sign 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 to merge. The best merge method is based on the traffic conditions.

Early Merge Strategy

Early merge strategy advises drivers to move out of the closed lane well before the forced merge point and before traffic starts to backup. Early merge works best when there is a low traffic volume on the road combined with high average speeds.

Late Merge Strategy

Late merge strategy or known as zipper merge works best when the road has high traffic volume and low average speed due to congestion. Drivers are instructed to remain in their respective lanes until they reach the designated merge point and at which time drivers take turns moving their vehicle into the open lane.

Benefits of Zipper Merge

- Reduced Travel Times
- Decreased Number of Work Zone Related Incidents
- Reduced Aggressive Driving
- Increased Traffic Capacity through Work Zone
- Shortened Queue Lengths before Work Zone

The benefits received from zipper merge are most noticeable when traffic conditions are above the following thresholds:

- Rural highways: 1000 vph for at least 2 hours per day
- Urban highways: 1500 vph for at least 2 hours per day

At lower traffic volume, drivers will likely merge early irrespective of signing. However, applying zipper merge for all lane closures on multi-lane highway work zones can still function and receives some of the benefits.

Key Changes

The zipper merge traffic accommodation strategy should be considered for all lane closures (long duration and short duration) on multi-lane highway work zones. Examples are:

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

The attached typical zipper merge signage layout should be used as a reference when developing the zipper merge signage strategy for the project. The following traffic accommodation drawings in the Traffic Accommodation in Work Zones (1st Edition 2008) are affected:

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 ≤ 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)

In addition to the Portable Changeable Message Sign message “MERGE POINT X km / USE BOTH LANES TO MERGE POINT” as shown in the typical zipper merge signage layout, the following messages can be considered for effective use:

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

The above affected traffic accommodation in work zones drawings will be modified when the next edition of the Traffic Accommodation in Work Zones manual is released.

Effective Date

February 20, 2015

Attachment

Typical Zipper Merge Signage Layout


Contact

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Highway Operations Standards, Alberta Transportation

References

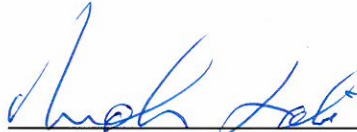
N/A

Recommended:

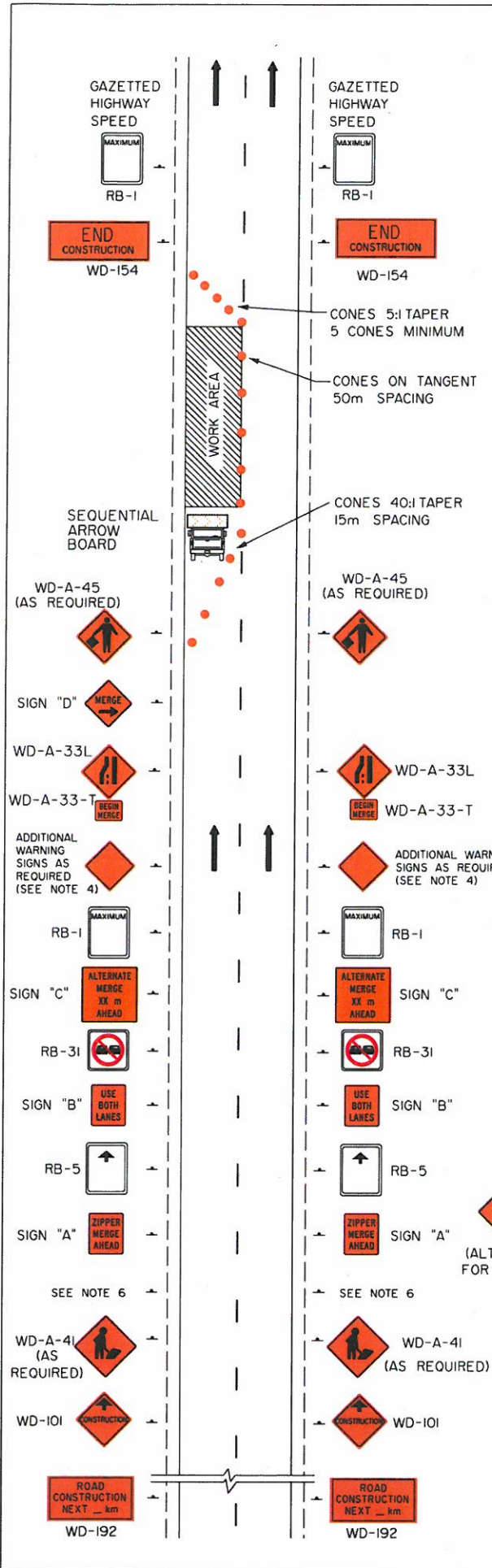


Steve Otto
Director, Highway Operations Standards
Operations and Planning Branch

Approved:



Moh Lali
Executive Director
Technical Standards Branch



- 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:
 - WD-A-III (ROADWORK)
 - WD-A-150 (LOOSE GRAVEL)
 - WD-A-22 (ROADWORK)
 - WD-104 (BARRICADE)
 - WD-A-49 (ROADWORK)
 - WD-A-100 (SHARP SHOULDERS)
 - WD-157 (FRESH OIL)
 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.
 9. Signs "A", "B" and "C" are oversized.

ZIPPER MERGE SIGNAGE LAYOUT

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| No. | REVISIONS | BY | DATE |
| Approved: | | | |
| Executive Director, Technical Standards Branch | | Alberta Transportation | |
| 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.: |