

**PROBLEM IDENTIFICATION AND CORRECTION BY LOCATION OF PROBLEM**

LOCATION	POSSIBLE PROBLEM	POSSIBLE TRAFFIC CONTROL CHANGE
1. Accidents or incidents occurring in the <u>warning or approach</u> area of the work zone	Insufficient advance warning signs	<ul style="list-style-type: none"> <li>• Add warning signs</li> <li>• Increase size of advance warning signs</li> <li>• Use changeable message signs</li> </ul>
	Speeds too high or high variance in speeds	<ul style="list-style-type: none"> <li>• Add advisory speed signs</li> <li>• Provide extra enforcement</li> <li>• Install rumble strips</li> </ul>
	Improper flagging technique	<ul style="list-style-type: none"> <li>• Train flaggers</li> <li>• Move flaggers upstream</li> </ul>
	Insufficient work zone traffic capacity	<ul style="list-style-type: none"> <li>• Provide alternate routes</li> <li>• Change work schedule to exclude peak traffic periods</li> </ul>
	Signs not visible at night	<ul style="list-style-type: none"> <li>• Mount signs at correct height above roadway</li> <li>• Install flashing warning lights on signs</li> <li>• Replace signs not meeting visibility requirements</li> <li>• Illuminate signs</li> </ul>
	Improper lane changes	<ul style="list-style-type: none"> <li>• Lengthen taper</li> <li>• Move taper position upstream</li> </ul>
2. Accidents or incidents occurring in the <u>transition area</u> of the work zone	Insufficient advance warning	<ul style="list-style-type: none"> <li>• Add advance warning signs</li> <li>• Increase size of advance warning signs</li> <li>• Use variable message sign</li> </ul>
	Lack of sufficient sight distance to taper	<ul style="list-style-type: none"> <li>• Move taper upstream to increase sight distance</li> </ul>
	Improper merging at lane closures	<ul style="list-style-type: none"> <li>• Move taper upstream to increase sight distance</li> <li>• Lengthen taper</li> </ul>
	Insufficient work zone capacity	<ul style="list-style-type: none"> <li>• Provide alternate routes</li> <li>• Change work schedule to exclude peak traffic periods</li> </ul>
	Transition not visible at night	<ul style="list-style-type: none"> <li>• Illuminate or reflectorize channeling devices</li> <li>• Add temporary pavement markers</li> </ul>
	Speeds too high or high variance in speeds	<ul style="list-style-type: none"> <li>• Provide extra enforcement</li> <li>• Add advisory speed signs</li> </ul>
	Advance warning signs too far upstream from transition	<ul style="list-style-type: none"> <li>• Move warning signs more frequently</li> </ul>
3. Accidents or incidents occurring on curves	Inadequate design for prevailing vehicle speeds	<ul style="list-style-type: none"> <li>• Improve edge line delineation</li> <li>• Add advisory speed plates</li> </ul>

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(Continued)**

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4. Accidents or incidents occurring in the <u>work area</u> of the work zone	Workers or equipment too near traffic station	<ul style="list-style-type: none"> <li>• Move equipment</li> <li>• Instruct workers to wear hard hats and safety vests</li> <li>• Instruct workers to stay as far as possible from traffic stream</li> <li>• Install Highway Advisory Radio</li> </ul>
	Speeds too high or high variance in speeds	<ul style="list-style-type: none"> <li>• Install rumble strips</li> <li>• Provide extra enforcement</li> <li>• Add advisory speed signs</li> </ul>
	Access and egress of work vehicles into traffic stream	<ul style="list-style-type: none"> <li>• Relocate work vehicle access and egress points</li> <li>• Have contractor furnish flaggers</li> </ul>
	Insufficient work zone traffic capacity	<ul style="list-style-type: none"> <li>• Provide alternate routes</li> <li>• Change work schedule to exclude peak traffic periods</li> <li>• Install Highway Advisory Radio</li> <li>• Reduce length of work area</li> </ul>
5. Accidents or incidents on two-lane, two-way traffic operations on divided highways	Passing in no-passing zone	<ul style="list-style-type: none"> <li>• Provide extra enforcement</li> <li>• Maintain tubes on centerline of two-way section</li> <li>• Use changeable message signs</li> </ul>
	Insufficient work zone traffic capacity	<ul style="list-style-type: none"> <li>• Provide alternate routes</li> <li>• Use changeable message signs</li> <li>• Notify media</li> </ul>
6. Accidents or incidents on one lane sections with alternating direction traffic operations	Excessive vehicle queues and delays	<ul style="list-style-type: none"> <li>• Reduce length of section</li> </ul>
	Improper flagging technique	<ul style="list-style-type: none"> <li>• Train flaggers</li> <li>• Move flaggers upstream</li> </ul>
7. Accidents or incidents occurring at median crossovers	Insufficient crossover delineation	<ul style="list-style-type: none"> <li>• Remove old pavement markings</li> <li>• Install new pavement markings</li> <li>• Install raised pavement markers</li> </ul>
	Speeds too high or high variance in speeds	<ul style="list-style-type: none"> <li>• Provide extra enforcement</li> <li>• Add advisory speed signs</li> </ul>
	Shifting of cargo loads in trucks	<ul style="list-style-type: none"> <li>• Provide extra enforcement</li> <li>• Add advisory speeds signs</li> <li>• Install raised pavement markings</li> </ul>

**PROBLEM IDENTIFICATION AND CORRECTION BY ACCIDENT TYPE**

<b>ACCIDENT TYPE</b>	<b>POSSIBLE PROBLEM</b>	<b>POSSIBLE TRAFFIC CONTROL CHANGE</b>
1. Fixed object accidents	Narrow work zone roadway	<ul style="list-style-type: none"> <li>Widen roadway by moving channelizing devices or by using narrower devices</li> <li>Improve reflectivity and delineation of devices</li> </ul>
	Insufficient advance warning	<ul style="list-style-type: none"> <li>Move taper upstream to increase sight distance</li> </ul>
2. Pedestrian accidents or incidents involving Pedestrians	Pedestrians on the roadway	<ul style="list-style-type: none"> <li>Install barriers between pedestrians and traffic</li> <li>Restrict pedestrian movements</li> </ul>
	Workers in or near traffic	<ul style="list-style-type: none"> <li>Install barriers between pedestrians and traffic</li> </ul>
3. Truck accidents or Incidents involving trucks	Speeds too high or high variance in speeds	<ul style="list-style-type: none"> <li>Provide extra enforcement</li> <li>Add advisory speed plates</li> <li>Use changeable message signs</li> <li>Notify media</li> </ul>
	Work zone roadway too narrow for large vehicles	<ul style="list-style-type: none"> <li>Provide truck detours</li> </ul>
4. Head-on accidents or Passing conflicts	Divided highway with two-way traffic operations	<ul style="list-style-type: none"> <li>Shorten length of two-way traffic operation</li> <li>Maintain channelizing devices on centerline</li> <li>Provide extra enforcement</li> <li>Notify media</li> </ul>
	Slow-moving maintenance operations	<ul style="list-style-type: none"> <li>Require work train to allow vehicles to pass occasionally</li> <li>Improve signing and lighting of work vehicle</li> <li>Change work schedule to periods of lower traffic volume</li> </ul>
5. Rear-end accidents or slow-moving vehicle conflicts	Insufficient work zone traffic capacity	<ul style="list-style-type: none"> <li>Provide alternate route</li> <li>Change work schedule to exclude peak traffic periods</li> <li>Reduce length of work area</li> <li>Install warning signs</li> </ul>
	Poor work vehicle access or egress to traffic stream	<ul style="list-style-type: none"> <li>Change work vehicle access or egress points</li> <li>Have contractor provide flaggers</li> </ul>
	Improper flagging technique	<ul style="list-style-type: none"> <li>Train flaggers</li> <li>Move flagger upstream</li> </ul>
	High variance in vehicle speeds	<ul style="list-style-type: none"> <li>Provide reasonable speed limits</li> <li>Provide extra enforcement</li> </ul>

**PROBLEM IDENTIFICATION AND CORRECTION BY ACCIDENT TYPE  
(Continued)**

LOCATION	POSSIBLE PROBLEM	POSSIBLE TRAFFIC CONTROL CHANGE
6. Sideswipe same direction accidents, merging accidents, and lane change or slow-to-merge conflicts	Insufficient taper length	<ul style="list-style-type: none"> <li>• Lengthen taper</li> <li>• Position arrow board near start of taper</li> <li>• Move taper upstream to increase sign distance</li> </ul>
	Insufficient acceleration lane length	<ul style="list-style-type: none"> <li>• Lengthen taper</li> <li>• Install yield or stop signs on on-ramp</li> <li>• Close on-ramp</li> </ul>
	Incorrect taper placement	<ul style="list-style-type: none"> <li>• Move taper upstream to increase sight distance</li> <li>• Position arrow board near start of taper</li> </ul>
7. Run-off-road accidents or shoulder encroachments	Narrow roadway	<ul style="list-style-type: none"> <li>• Widen roadway</li> <li>• Improve edge line delineation</li> <li>• Provide extra enforcement</li> </ul>

**PROBLEM IDENTIFICATION AND CORRECTION BY  
TIME-OF-DAY/WEATHER CONDITIONS**

<b>TIME/WEATHER</b>	<b>POSSIBLE PROBLEM</b>	<b>POSSIBLE TRAFFIC CONTROL CHANGE</b>
1. Night accidents	Poor visibility or delineation	<ul style="list-style-type: none"> <li>• Illuminate or reflectorize channelizing devices</li> <li>• Remove old pavement markings</li> <li>• Add temporary raised pavement markings</li> <li>• Add temporary pavement edge lines</li> </ul>
	Equipment or vehicles stored near roadway	<ul style="list-style-type: none"> <li>• Store vehicles and equipment at location away from roadway</li> </ul>
2. Accidents or incidents during periods of peak traffic volume	Insufficient work zone traffic capacity	<ul style="list-style-type: none"> <li>• Provide alternate routes</li> <li>• Change work schedule to exclude peak traffic periods</li> </ul>
	Access and egress of work vehicles into traffic stream	<ul style="list-style-type: none"> <li>• Relocate work vehicle access and egress points</li> <li>• Have contractor provide flaggers</li> </ul>
3. Accidents or incidents during weekend periods	Vandalized or stolen traffic control devices	<ul style="list-style-type: none"> <li>• Furnish night watchman</li> <li>• Increase routine police patrols</li> </ul>
	Trucks or recreational vehicles unable to negotiate curves	<ul style="list-style-type: none"> <li>• Lengthen tapers</li> <li>• Use changeable message signs</li> <li>• Notify media</li> </ul>
4. Accidents or incidents during inclement weather	Poor visibility or delineation	<ul style="list-style-type: none"> <li>• Remove old pavement markings and replace with new pavement markings</li> <li>• Install raised pavement markers</li> </ul>
	Poor drainage	<ul style="list-style-type: none"> <li>• Improve superelevation</li> <li>• Patch low pavement areas</li> <li>• Prevent mud from washing onto roadway</li> </ul>

