

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

**PROBLEM IDENTIFICATION AND CORRECTION BY LOCATION OF PROBLEM
(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"> • Move equipment • Instruct workers to wear hard hats and safety vests • Instruct workers to stay as far as possible from traffic stream • Install Highway Advisory Radio
	Speeds too high or high variance in speeds	<ul style="list-style-type: none"> • Install rumble strips • Provide extra enforcement • Add advisory speed signs
	Access and egress of work vehicles into traffic stream	<ul style="list-style-type: none"> • Relocate work vehicle access and egress points • Have contractor furnish flaggers
	Insufficient work zone traffic capacity	<ul style="list-style-type: none"> • Provide alternate routes • Change work schedule to exclude peak traffic periods • Install Highway Advisory Radio • Reduce length of work area
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"> • Provide extra enforcement • Maintain tubes on centerline of two-way section • Use changeable message signs
	Insufficient work zone traffic capacity	<ul style="list-style-type: none"> • Provide alternate routes • Use changeable message signs • Notify media
6. Accidents or incidents on one lane sections with alternating direction traffic operations	Excessive vehicle queues and delays	<ul style="list-style-type: none"> • Reduce length of section
	Improper flagging technique	<ul style="list-style-type: none"> • Train flaggers • Move flaggers upstream
7. Accidents or incidents occurring at median crossovers	Insufficient crossover delineation	<ul style="list-style-type: none"> • Remove old pavement markings • Install new pavement markings • Install raised pavement markers
	Speeds too high or high variance in speeds	<ul style="list-style-type: none"> • Provide extra enforcement • Add advisory speed signs
	Shifting of cargo loads in trucks	<ul style="list-style-type: none"> • Provide extra enforcement • Add advisory speeds signs • Install raised pavement markings

PROBLEM IDENTIFICATION AND CORRECTION BY ACCIDENT TYPE

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

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"> • Lengthen taper • Position arrow board near start of taper • Move taper upstream to increase sign distance
	Insufficient acceleration lane length	<ul style="list-style-type: none"> • Lengthen taper • Install yield or stop signs on on-ramp • Close on-ramp
	Incorrect taper placement	<ul style="list-style-type: none"> • Move taper upstream to increase sight distance • Position arrow board near start of taper
7. Run-off-road accidents or shoulder encroachments	Narrow roadway	<ul style="list-style-type: none"> • Widen roadway • Improve edge line delineation • Provide extra enforcement

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

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