Work Zone Intrusion Prevention

Model State Practices

	AL	AK	AZ	AK	CA	CO	CT	DC	DE	FL	GA	HI	ID	IL	IN	IA	KS	KY	LA	ME	MD	MA	MI	MN	MS	MO	MT	NE	NV	NH	NJ	NM	NY	NC	ND	OH	OK	OR	PA	PR	RI	SC	SD	TN	TX	UT	VT	VA	WA	WV	WI	WY
Full Road Closure			X							X					X								X	X		X										X					X				X		X	X		X	X
Ramp Closures																										X										X	X				X				X	X		X	X
Maintain Lanes/ Strengthen Shoulders										X				X																												X				X			X	
Design for Safety/Construct -ability Review					X	X				X					X											X							X			X					X				X		X			X	
Set Work Zone Speed Limits										X														X		X								X												X		X	X		X	X
Increase Penalties										X														X		X								X								X				X		X	X		X	X
Minimum Shoulder Width																																					X					X						X			x	
Minimum Shoulder Thickness														X																																		X				
Slow Moving Operations										X					X							X					X							X								X				X		X			X	X
Commercial Carrier Awareness Campaigns										X																X								X					X							X						
General Public Awareness		X	X				X			X				X		X						X		X	X		X					X		X			X		X			X	X		X	X		X	X
WZ Safety Audits														X											X		X																						X				
Bridge Widening																																																		X			X	
Access/Egress Planning						X										X					X	X		X																						X			X				
Accelerated Bridge Construction										X														X		X																						X			X				
Temporary Pull-Off Areas										X											X			X									X														X			X	X		X	
Safety Program Specification																										X					X																			X		X				
Moveable Barrier															X									X																										X		X				
Restrictions and Detours for Large Trucks										X														X		X									X								X				X						X
Reduce Speed when Flashing															X																																		X						
Traffic Sensing PCMS																										X										X								X									
Lighted Stop/ Slow Paddle	X															X							X	X											X		X		X			X	X				X					
Traffic Pacing/Rolling Road Blocks										X																X																						X			X				
Lighting Specification										X																					X																		X			X	X			X
Improved Warning Lights																										X																						X			X				
Innovative Use of Law Enforcement					X					X						X			X		X			X		X					X			X		X										X			X	X			

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Automated TTC Placement & Retrieval					X[i]																																														
Automated Flagger										X																X															X						X	X		X	
Positive Protection										X																X															X				X		X		X	X
Automated Speed Enforcement														X							X			X								X						X						X						
Speed Monitoring Displays																					X			X										X						X								X	X		X	
Variable Speed Limits																							X	X		X																				X	X		X	X			
Innovative Pavement Markings																X		X			X		X																						X				X	X			
Portable/ Temporary Rumble Strips	X	X	X	X	X	X		X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X
Intrusion Alert Systems																																																X				

Road Closures: The full closure or partial closure of a roadway is a strategy designed to eliminate the exposure of road users to highway work zones and road workers to traffic by temporarily closing a highway facility and implementing a detour. Each project is analyzed and a determination is made, prior to construction, concerning road closures that will be permitted during construction. Total closures of a section of road are used for a period of time to efficiently complete construction and minimize overall impacts to travelers. Weekend and daily closures should be considered on a project-by-project basis as a good alternative to a lengthy series of closures.

Maintain Lane Numbers/Strengthen Shoulders: Maintain the existing number of lanes for the various work phases. The travel lanes may be narrowed and shoulder lanes are reinforced (if not built strong enough initially to support traffic) in order to maintain the same number of travel lanes during a work zone. Typically, at least one lane is wider than the others and trucks are restricted to the wider lane(s).

Ramp Closures: Implement ramp closures on all projects during reconstruction efforts on Interstates and freeways.

Design for Safety: This effort aims to identify safety related items for opportunities to develop worker safety practices for designers to consider when designing projects. An example of an item is the design of project access for maintenance workers from off the Right-of-Way (ROW). Some practical considerations were to purchase additional ROW, or to round slopes to provide easier access. In a similar vein, a constructability review process (CRP) is an iterative, multi-disciplinary review of the Plans, Specifications, and Estimates documents (PS&Es) at various defined stages of the project development process. This review will include all functional areas including, but not limited to traffic, design, construction, and maintenance to improve overall constructability.

Set Speed Limits for Work Zones: Create guidelines, proper layouts, and procedures for implementing work zone speed limits.

Increased Penalties for Speeding: Set increased speeding fine penalties in work zones.

Minimum Work Zone Shoulder Width: Set work zone lane and shoulder widths to meet the minimum geometric standards. For example, one state's internal policy calls for 300 ft. minimum acceleration lanes.

Minimum Work Zone Shoulder Thickness: New construction or reconstruction projects on truck routes that involve the construction of new shoulders shall meet thickness to allow the shoulders to be used, if necessary, to carry traffic during construction improvements and incident management.

Policy/Standards for Slow Moving Operations: Develop definitions and separate standard drawings for traffic control set-up for moving and mobile operations. May include scenarios for both two-lane and multi-lane roadways, including when to use flaggers, shadow vehicles, changeable message signs, and stationary signage.

Public Awareness Campaigns for Commercial Carriers (Large Trucks): Some public campaigns and outreach efforts are focused on motor carriers to help prevent work zone crashes.

General Public Awareness: Effective outreach can help inform motorists of upcoming construction efforts, educate motorists about detour routes, and reduce delays as motorists plan in advance to detour around work zones along their route. Information provided through the media is one way to reach a large audience about road work. This can be effective by establishing regular contact with \state and/or local media (radio, TV, and cable) to provide an on-going dialogue on work zone safety issues. When

appropriate, a regional transportation coalition can be created to help agencies coordinate road projects and serve as a clearinghouse for transportation incident and construction information. Traffic safety information centers can be set up at rest areas, as well as electronic newsletters, construction alerts, websites and social media such as Twitter, Facebook, etc. Some jurisdictions hire public relations firms to assist in the communications.

Work Zone/Construction Safety Audit: A road construction safety audit (RCSA) evaluates the traffic control plan, devices used, and potential strategies before an Interstate work zone is established on the roadway. The objective of the RCSA is to ensure that safety considerations have not been overlooked, and alternative devices and strategies have been considered.

Bridge Widening: Widen relevant bridges (to 56 feet) during rehabilitation to accommodate four lanes of traffic during future reconstruction.

Access/Egress Planning: Develop construction vehicle access/egress policies and practices to promote safety for workers and motorists in work zones. Policies typically address how job sites will provide a safe means for work vehicles and equipment to enter and exit travel lanes and for delivery of construction materials to the work space. The MUTCD allows for the use of temporary traffic control signs which alert road users to locations where unexpected construction vehicles may be present on the roadway.

Accelerated Bridge Construction: Accelerated bridge construction (ABC) involves using various methods during project, planning, design, contracting, and construction to significantly reduce the time to construct/re-construct a bridge, as compared to traditional cast-in-place methods.

Temporary Pull-Off Areas: Pull-off areas may serve one or more functions: 1. Vehicle refuge – for motorists who experience vehicle malfunctions; 2. Enforcement – for law enforcement personnel to pull over drivers and issue citations; and 3. Crash clearing and/or investigation. They also provide emergency response vehicles more space to aid victims after a crash, reducing the need to take an additional traffic lane.

Safety Program Specification: This specification requires a contractor to have a written safety program prior to starting work on a project. Elements of the program include safety responsibilities, emergency plans, training, implementation, and discipline procedures. The specification must be written by a qualified safety professional.

Restrictions and Detours for Over-Sized Vehicles: Work zone truck lane restrictions involve restricting trucks to designated highway lanes and ensuring at least one lane is used exclusively by passenger vehicle. In some instances, the DOT works with the state permitting agency to inform and direct over-sized, over-weight, and over-height vehicles around restricted work zones.

Reduce Speed When Flashing: This practice allows for normal speed driving in portions of a work zone where actual construction work is not in progress. A reduced speed limit (at least 10 mph below the posted limit) when flashing sign is only activated when in the vicinity of actual construction activity and/or workers are present.

Traffic Sensing on Changeable Message Signs: Traffic sensing technology is placed on portable changeable message signs (PCMS) to alert drivers that they are approaching a work zone. These sensing PCMS are placed in advance of work zones and are intended to alert drivers that something is unusual on or near the road ahead.

Lighted Stop/Slow Paddle: The lighted stop/slow paddle is used to control traffic through work zones. It is equipped with halogen lights, which can be illuminated by the operator of the sign. The halogen paddle is visible from distances beyond 285 feet, and it is especially useful during daytime operations.

Traffic Pacing/Rolling Road Blocks: This method is used when roadway construction activities (e.g., placing bridge beams, overhead sign structures, etc.) are taking place in or above all lanes of the roadway, thus requiring traffic to be temporarily slowed rather than completely stopped. Traffic is paced at a safe speed (desirably not less than 20 mph on the Interstate) to provide a gap in traffic and allow the work activities to be performed. The pacing of traffic is controlled by pilot vehicles (i.e., law enforcement vehicles with blue lights flashing) driven by uniformed law enforcement personnel.

Nighttime Lighting Specification: To improve safety for both workers and travelers, nighttime lighting specifications are needed to enhance work zone safety and provide quality workmanship for specific work elements. Portable lighting should be used at flagging locations to highlight the presence of the flagger (but also to minimize glare to drivers).

Improved Warning Lights: Outfit trucks with a visible strobe type warning light that uses a 180-watt output controller to increase the power and visibility of the lights, compared to previously used 50-watt bulbs. Through field tests travelers indicated that the light was more visible with better recognition, even up to 1 mile away. Several agencies have experimented with the use of innovative work vehicle lighting strategies, such as blue lights on paving equipment or green lights on truck mounted attenuators. Several state highway agencies use warning lights on channelizing devices, particularly drums.

Innovative Use of Law Enforcement: Use of an interagency agreement for police presence in work zones between the state (and local) police and the DOT to provide services on an as-needed basis. State police, where appropriate, provide awareness of work zone areas and enforcement of the speed limit. The interagency agreement shares the responsibility between the DOT and state police for enhancing highway worker and motorist safety in and around highway work zones. To safely perform their duties in work zones, police officers need to be properly trained. Some DOTs offer a work zone training program for law enforcement personnel about work zones-specific safety and temporary traffic control. In some states, a state police liaison officer is available to provide input on highway safety related issues including work zones.

Automated Machine for TTC Placement and Retrieval: Use of machines that mechanically place and retrieve cones, thus reducing maintenance personnel exposure to the hazards of traffic and physical exertion involved in handling the cones.

Automated Flagger Assistance Devices: Automated flagger assistance devices are remotely operated temporary traffic control devices used to remove flaggers from the traveled way in a temporary traffic control zone. A single flagger can operate the automated devices placed at either end of the work zone via a radio control unit or cable directly attached to the device.

Positive Protection: Portable traffic barriers are used by highway agencies to "physically prevent vehicles and pedestrians traveling through the work zones from entering space occupied by workers, equipment, materials or roadside hazards. A variety of types of barriers can be used for positive protection depending on the work zone scenario, including portable concrete barriers, ballast-filled barriers typically filled with sand or water, portable steel barriers, mobile barrier trailers or moveable barrier systems, and truck mounted attenuators.

Automated Speed Enforcement: Automated speed enforcement systems are used by agencies which typically consistent of traffic enforcement cameras, photo enforcement programs, or other ITS devices intended to enforce work zone speed limits more strictly. These systems identify drivers who exceed the speed limit by a specific amount and issue related citations.

Speed Monitoring Displays: Speed monitoring displays, also referred to as dynamic speed displays, are used by highway agencies to manage speeds to reduce the risk of traffic crashes. They generally consist of a PCMS or other smaller display in conjunction with radar or other speed monitoring technology.

Variable Speed Limit Systems: Variable speed limit systems are not legal in all states. Some agencies have implemented variable ***advisory speed*** limits to avoid legal concerns. Variable speed limit systems incorporate a changeable display to show the speed limit for localized areas based upon the consideration of current conditions, such as downstream congestion or construction operations.

Innovative Pavement Markings: Pavement marking strategies involve treatments to improve the performance of temporary work zone pavement markings. These can include raised, wet-reflective, wider, and orange markings (use of orange markings is in the test phase currently).

Portable or Temporary Rumble Strips: The use of portable or temporary rumble strips is a strategy which has been used by most state agencies. The use of rumble strips for temporary traffic control are covered within Section 6F.87 of the MUTCD and are intended to "alert drivers to unusual vehicular traffic conditions." The use of Temporary Portable Rumble Strip (TPRS) is allowed in nearly every ***short duration*** work zone across the country. Thirteen states require their use, under certain conditions, in a two-lane, one-way flagging operations and/or lane closures: Texas, California, Florida, Maine, Massachusetts, Montana, North Dakota, Michigan, Wisconsin, Virginia, Utah, Iowa, and Mississippi.

Intrusion Alert Systems: Intrusion alert systems generally provide an audible or visual alert to workers if an errant vehicle may be entering the work area. Intrusion alert systems are of specific interest for work zones which are not protected by barriers or are implemented within high-speed facilities.

[ii]

[i] U.S. Federal Highway Administration, Work Zone Operations Best Practices Guidebook (Third Edition), Publication No. FHWA-HOP-13-012, August 2013; https://ops.fhwa.dot.gov/wz/practices/best/bestpractices.htm
[ii] U.S. Federal Highway Administration, Toolbox of Low-Cost Work Zone Management Strategies, prepared by Michigan State University, 2021; https://workzonesafety-media.s3.amazonaws.com/workzonesafety/files/documents/training/fhwa_wz_grant/msu_toolbox_low-cost_wz_strategies-508.pdf