

2018 Connecticut Work Zone Reviews

Annual Report



State of Connecticut
Department of Transportation
Office of Construction

Prepared by
Anthony O. Kwentoh, P.E.
Kiah A. Patten

Reviewed by
James P. Connery, P.E.
Construction Division Chief

Contents

Introduction

Findings and Recommendations

Summary

Appendix: 2018 Work Zone Safety Field Review Reports*

* In lieu of attaching extensive review reports to the Annual Report, links will be provided to access the reports electronically.

A. Regular Field Reviews

1. [0017-0182](#), Bristol
2. [0034-0309](#), Danbury
3. [0058-0332](#), Groton
4. [0056-0307](#), Greenwich
5. [0063-0633](#), Hartford
6. [0063-0699/0700/0701](#), Hartford
7. [0084-0099/0100](#), Monroe
8. [0163-0203](#), Windham
9. [0170-3488](#), Middlefield, Middletown
10. [0170-3488](#), Groton
11. [0170-3488](#), Norwalk
12. [0170-3488](#), East Granby
13. [0171-0442 A](#), Glastonbury
14. [0172-0478 G](#), Ashford
15. [0173-0495 E](#), Wilton
16. [0174-0403](#), Newtown, Southbury, Farmington
17. [0174-0423 A](#), Winchester, Barkhamsted

B. In-Depth Field Reviews

1. [0094-0252](#), New London
2. [0130-0182](#), Southbury
3. [0158-0207/0211](#), Westport
4. [0171-0431](#), East Windsor, Willington

Introduction

The Connecticut Department of Transportation (CTDOT) Office of Construction (OOC) conducts work zone safety field reviews in compliance with 23 CFR 630 Subpart J to evaluate the effectiveness of work zone safety and mobility practices and procedures in the field. The reviews were conducted for randomly selected active highway construction and maintenance projects administered by CTDOT.

During the field reviews, the review team inspects the quality of traffic control devices, construction sign pattern installation and removal, sign recognition and visibility, and opportunities to enhance safety for motorists. A work zone safety pre-meeting is held where a questionnaire can be reviewed to determine strengths and opportunities for improvement in the work zone procedures. The focus areas that are inspected include temporary lane closure, temporary signalization, pedestrian/bicycle access, stage construction, detour, and night work. There is also an overarching goal to determine if the findings are the results of potential systemic issues.

During a regular field review, personnel from the OOC, the Office of Maintenance, and the Division of Traffic Engineering (Traffic) are accompanied by the project staff from the District to tour the project's work zone. The review team evaluates what is being implemented and uses best practices and lessons learned as a teaching tool for the project staff, as well as, other Construction inspection staff in subsequent training sessions. The OOC has set a goal to conduct a minimum of ten (10) regular field reviews a year.

For in-depth reviews, the review team may include personnel from the OOC, Traffic, and Federal Highway Administration (FHWA). The team will tour the work zone with the project staff to review what is being implemented and note FHWA's point of view in comparison to the federal standard. The OOC has set a goal to conduct four in-depth field reviews a year.

For both types of review, reports noting findings with corresponding recommendations for improvements and/or best practices, photographs of field conditions, and answers to the questionnaire are compiled and then distributed to all participants. The reports either help identify issues that need immediate action, identify possible systemic issues that need addressing on a statewide level, or find the best practices that could improve Connecticut's Work Zone Safety practices.

For the 2018 construction season, the OOC completed seventeen (17) regular reviews and four (4) in-depth reviews. The findings from these reviews were compiled and sorted by similarities. These findings were categorized by the following:

- Project Coordination
- Radar Speed Trailer
- Rolling Road Block

- Stakeholder Communication
- TMP Maintenance
- Best Practices
- Clear Zone Interference
- CMS Spacing
- CMS Timing
- Conflicting Markings
- Design Issues
- Enforcement Coverage
- Enforcement of Plans
- Enforcement of Specifications
- Missing Specifications
- Personal Protective Equipment Compliance
- Pedestrian / ADA Issues
- Proper Messaging
- Protection of the Work Zone
- Quality of Devices
- Selective Clearing
- Work Zone Interference

Findings of the work zone field reviews will be added to the action item list of the Work Zone Safety and Mobility Process Review for resolution by the appropriate Department unit. The Process Review is an evaluation tool used for the Department's work zone program. The Process Review team is comprised of personnel from the OOC, Traffic, Office of Highway Maintenance Operations, Office of Policy and Planning, and FHWA Division Office. Opportunities for improvement, successful practices, and implementation of new technologies can be efficiently proposed and managed between these units to develop a holistic work zone safety program the Department can benefit from.

Findings and Recommendations by Category

CATEGORY	PROJECT NO.	FINDINGS	RECOMMENDATIONS
Best Practices, Radar Speed Display	0094-0252	There was a speed trailer within the work zone. It displayed a sign with the reduced speed limit of 45 mph.	It is a good practice to use devices that can calm speeds within work zones. These have continued to be effective.
Best Practices, Rolling Road Block	0158-0211	The Rolling Road Block for the southbound side started at 7:03 pm and ended at 7:14 pm (11 minutes). The Rolling Road Block for the northbound side started at 8:00 pm and ended at 8:13 pm (13 minutes).	The Rolling Road Block was kept within the allowable 15 minutes.
Best Practices, Rolling Road Block	0170-3488 B	The Rolling Road Block took place from 8:10 pm to 8:20 pm.	The Rolling Road Block was compliant with the criteria of Construction Directive CD-2016-2.
Best Practices, Rolling Road Block	0171-0442 A	The Rolling Road Block used to install the traffic pattern went from 7:03 pm to 7:18 pm (15 minutes).	The sign crew was compliant with the Construction Directive to use a RRB within 15 minutes.
Best Practices, Safety Meeting	0171-0442 A	The project held a tailgate Safety Meeting prior to proceeding onto the road. MTV weight limitations was discussed and closing Hubble Street.	Having tailgate talks is a good practice to ensure work crew is familiar with work conditions and safety expectations.
Clear Zone Interference	0158-0211	There was equipment parked within the clear zone.	Equipment and materials need to be at least 26 feet off the edge of the roadway or positively protected.
Clear Zone Interference	0171-0442 A	A paver was parked within the clear zone of Route 17.	Since the highway speed was 50 mph, equipment and material have to be at least 24 feet off the road or positively protected.
Clear Zone Interference	0171-0442 A	A construction sign is placed within the deflection zone of the guiderail.	Guiderail can be used to protect materials and equipment as long as it's stored outside the deflection zone.
Clear Zone Interference	0173-0495 E	Equipment was parked at the edge of the roadway.	Blunt objects need to be outside of the clear zone (at least 16 feet from edge of the roadway) or positively protected.
Clear Zone Interference	0174-0403	Some bridges in the project were stage construction, some were non-stage construction.	When packaging bridge projects, bridges of similar style should be packaged together to set up construction in a similar manner for repairs.

CATEGORY	PROJECT NO.	FINDINGS	RECOMMENDATIONS
Clear Zone Interference	0174-0423 A	The Crew Leader said that catch basin tops are laid by the edge of road where they will be installed that day. Otherwise, they're stored in the storage pit off the road. The General Supervisor said that the crews typically install three (3) to seven (7) tops a day. When doing a drive through, three (3) catch basin tops were placed near the edge of the roadway.	The tops would normally be a hazard being stored next to the edge of the roadway. The sequence of the work dictates being placed near where they will be permanently installed each day.
CMS Placement	0094-0252	There were two Changeable Message Signs within close proximity to each other.	Changeable Message Signs and Variable Message Signs need to be a minimum of 1000 feet apart.
CMS Placement	0170-3488 B	The CMS was obstructed by an exit sign and span pole.	The message being obstructed can prevent motorists from reading the whole message and cause confusion. The sign should be moved to a clearer area.
CMS Timing	0094-0252	The Changeable Message Sign at Exit 84 on I-95 SB had a long transition from first frame to the second.	The timing between frames need to be quick enough so motorists can read all frames while driving by.
Conflicting Markings	0063-0699/0700/0701	The existing pavement markings can still be seen on the roadway and confusing to motorists.	Eradicate all conflicting pavement markings. A guidance document can be developed on how to treat pavement marking removal.
Enforcement Coverage	0034-0309	The police orders may not always get filled for the night shift where their presence is preferred.	If municipal police are unavailable to fill orders, state police should be considered for presence in the work zone. Add to State Police Procedure.
Enforcement of Plans	0017-0182	Temporary Precast Concrete Barrier Curbs across from the NISSAN car dealership need delineators.	Delineators should be attached to the top of the barrier as shown on the plans.
Enforcement of Plans	0158-0211	There was a Shoulder Closed Ahead sign within the closed shoulder, not in advance of it.	Advance warning signs should be installed before the changed condition to allow motorists time to respond appropriately.
Enforcement of Specifications	0171-0431	The barricade warning lights were missing on some of the post-mounted, diamond-shaped signs.	Traffic plans call for all post-mounted, diamond-shaped signs to have barricade warning lights on them.
Enforcement of the Plans	0017-0182	Material was stored adjacent to the roadway with no protection.	Objects need to be stored outside the clear zone or be positively protected.

CATEGORY	PROJECT NO.	FINDINGS	RECOMMENDATIONS
Enforcement of the Plans	0058-0332	It was observed that a liability sign was mounted on the I-95 SB off ramp but not on the I-95 NB off ramp.	All traffic signs need to be installed as noted on the plans and additional signs can be added if needed. Any changes need to be approved by Traffic Engineering.
Enforcement of the Plans	0084-0099/0100	A Type A impact attenuation system used a traffic drum as it's delineator.	The nose of the attenuation system should have an attenuation delineator.
Enforcement of the Plans	0084-0099/0100	Many reflectors on the TPCBCs had silver on the right side of the roadway but on the back of delineators there was yellow.	Delineators on the right side of the roadway should only have the silver facing the traffic and nothing on the rear.
Enforcement of the Plans	0084-0099/0100	The passing zones for both projects still exist.	The passing zone at the north end of the second project should be eliminated during construction (as shown on sheet 02.04.03). Also, it is recommended that the existing passing zone through the first project site be removed entirely during the bridge construction and reinstalled as shown on the final SPM plan.
Enforcement of the Plans	0158-0211	There was no advance warning signs placed on the northbound side during the Rolling Road Block unless they were installed by another crew behind Rolling Road Block.	Traffic signs and devices should be installed according to plan.
Enforcement of the Plans	0158-0211	Forty-two inch traffic cones were used for the exit ramp taper instead of traffic drums at 40 feet spacing.	The proper devices should be used as noted on the plans.
Enforcement of the Plans	0158-0211	The traffic cones were installed in open travel lane or on lane lines.	The full width should be provided for the open travel lane for traffic.
Enforcement of the Plans	0163-0203	The END ROAD WORK signs are installed before the work area ends.	The END ROAD WORK signs should be moved to ends of the work areas on both sides of the bridge.
Enforcement of the Plans	0170-3488 A	There were no liability signs posted but the Contractor says he will post them once given the locations for where they should go.	Liability signs need to be posted before any patterns or work takes place to inform motorists of upcoming construction work and who is liable for an incident.
Enforcement of the Plans	0170-3488 A	There was no END ROAD WORK sign posted at the end of the pattern.	End Road Work signs let the motorist know when they have proceeded through a work zone and that they can return to their normal roadway speed. Traffic

CATEGORY	PROJECT NO.	FINDINGS	RECOMMENDATIONS
			signs and devices should be installed according to plan.
Enforcement of the Plans	0170-3488 D	Only one arrow was placed to guide motorists to appropriate lane.	If more than one lane is shifted, an arrow needs to be placed in each lane. Arrows are needed especially for traffic patterns proceeding through an intersection.
Enforcement of the Plans	0170-3488 D	The video detection cameras had not yet been installed at the five signalized intersections within the project, but the District staff was not aware of the lack of detection causing any issues.	Adhere to the specifications for video detection.
Enforcement of the Plans	0170-3488 D	When the Route 20 EB right lane closure traffic pattern was being installed, the traffic cones were being placed approximately two feet to the left of the broken lane line. This limited the area for the open travel lane and caused them to cross over the double yellow center line into the Route 20 WB left travel lane.	Adhere to the traffic plans when setting up lane closures.
Enforcement of the Plans	0171-0431	It was observed that the liability signs on I-84 Eastbound and Westbound in Willington were placed too close to the work zone.	According to the Traffic Plan Typical (attached), these signs should be placed far enough in advance of the work zone to allow motorists to exit if they do not want to drive through the work zone.
Enforcement of the Plans	0171-0442 A	No END ROAD WORK sign was placed at the end of the pattern.	END ROAD WORK signs are necessary to inform motorists when they have proceeded through the work zone and can use the full width of the roadway to drive at the full speed limit.
Message Confusion	0063-0699/0700/0701	There were signs stating LEFT TWO LANE S CLOSED, then LEFT LANE CLOSED, and then LEFT TWO LANES CLOSED.	Mixed messaging can confuse motorists when they are transitioning into a traffic pattern.
Message Confusion	0170-3488 C	The liability sign on Route 7 Northbound was mounted too low and was obstructed by some of the brush.	The liability sign needs to be raised high enough for motorists to easily read while driving by and selective clearing should be done to prevent messaging from being obstructed.

CATEGORY	PROJECT NO.	FINDINGS	RECOMMENDATIONS
Missing Specifications	0034-0309	There was no item for a Changeable Message Sign included in the contract.	Although the project is on a local road, informing motorists through advance warning devices of impending work can help reduce impacts and congestion.
Missing Specifications	0034-0309	There were no holiday restrictions included in the contract but the project usually gets shut down for the holidays.	There are some holidays where all work on roads is stopped. Those holidays should be included in every contract so no work is cancelled last minute and money wasted.
More Devices Needed	0170-3488 C	There are two left turn lanes to turn onto the expressway of Route 7 Southbound. Since the right lane on the expressway was closed the right left turn lane was closed as well to prevent anyone turning into the closed lane. Some motorists not realizing that there was only one left turn lane open, queued in the median. When the light changed and all motorists proceeded to the expressway, the motorists in the median realizing they were in the wrong place, tried to merge into the other lane, and other motorists wouldn't let them merge in. There was a potential for a crash to occur or at least delays from the merging vehicles.	The review team suggested to the inspection staff to place cones in the median to channelize the traffic into one lane before turning onto the expressway. This way, motorists will know that there is only one lane open.
More Protective Equipment Needed	0174-0423 A	Truck-Mounted Attenuators were not used.	TMAs should be used for work area protection.
Opportunities to Enhance Safety	0084-0099/0100	The impact attenuation system used to protect the sides of the water tank was too short in its array.	The array for the system should be extended to better protect against any blunt ends upon impact.
Pedestrian/ ADA Issues	0017-0182	Due to staging revisions resulting from underground utility conflicts, it was practically not feasible to maintain pedestrian pathways and ADA compliance in the work zones. The project design did not provide clear detours for pedestrians.	Temporary sidewalks should have been installed for pedestrians to use or pathways in the road can be created and protected with barrier around utility work.

CATEGORY	PROJECT NO.	FINDINGS	RECOMMENDATIONS
Pedestrian/ ADA Issues	0034-0309	Advance warning signs are mounted on the sidewalk.	Construction devices or materials should not block pedestrians from accessing pathways. Either the objects should be moved or another pathway be given around them.
Pedestrian/ ADA Issues	0063-0633	Plywood ramps and gravel pathways were used for handicapped access to a nearby church.	Gravel pathways and plywood ramps aren't compliant with ADA requirements and more secured pathways need to be provided.
Pedestrian/ ADA Issues	0063-0633	Pedestrians are passing under caution tape used to close off sections of the sidewalk.	Pedestrian safety should be evaluated on regular basis due to the various sequencing of field operations every day. Also, construction fencing can be used to prevent pedestrians from entering closed sections.
Proper Messaging	0084-0099/0100	On the day of the review had a shoulder closure with brief stoppages for tree clearing but the sign said "One Lane Road."	Ensure the proper signing pattern is in place for the operation being performed. Signs stating "Shoulder Closure" or "Be Prepared to Stop" or one with a flagger depiction would have been more appropriate.
Protection of the Work Zone	0034-0309	The trench in the work area had an unprotected edge.	Temporary concrete barriers can provide protection to workers from errant vehicles.
Protection of the Work Zone	0130-0182	The drop-off by the edge of the roadway of Route 188 eastbound is unprotected.	Positively protecting the edge on the eastbound side can enhance the safety within the work zone.
Protection of the Work Zone	0170-3488 A	While setting up the traffic pattern, the Exit 13 on ramp was not closed before crossing over to install the taper.	Truck-mounted attenuators or police cruisers could've been used to close the ramp. It would be safer to do this before crossing over the ramp so no motorist would proceed into the Rolling Road Block and closed lane while being set up.
Public Outreach	0063-0633	The project has Twitter and Facebook accounts and the Consultant has a website to post project updates. Also, flyers are given to local residents and the nearby church with project updates.	PI/PO on this project appears to be following very good practices to keep businesses, pedestrians, and the Town Officials informed on project impacts and mitigation efforts.

CATEGORY	PROJECT NO.	FINDINGS	RECOMMENDATIONS
Quality of Devices	0017-0182	Multiple cones placed to delineate work areas were deemed to be in marginal conditions.	Devices in poor condition should be replaced. Refer to the ATSSA Quality Guidelines for Temporary Traffic Control Devices and Features.
Quality of Devices	0056-0307	There was a traffic control device that was in poor condition.	For acceptable conditions for traffic control devices, refer to the ATSSA Quality Guidelines for Temporary Traffic Control Devices and Features.
Quality of Devices	0130-0182	Some of the traffic control devices were in poor condition.	Refer to the ATSSA Quality Guidelines for Temporary Traffic Control Devices and Features.
Quality of Devices	0163-0203	Delineators on top of temporary barrier were bent out of shape and only had one side with a color.	Refer to the ATSSA Quality Guidelines for Temporary Traffic Control Devices and Features for acceptable quality of devices. Also, delineators on an alternate one-way traffic pattern should have white on one side and yellow on the other for both sides of the roadway.
Quality of Devices	0170-3488 A	The Right Lane Closed Ahead sign was in unacceptable condition and needed to be replaced.	For acceptable quality of traffic control signs and devices, refer to the ATSSA Quality Guidelines for Temporary Traffic Control Devices and Features.
Quality of Devices	0170-3488 B	Some of the signs were dirty and the reflectivity was affected.	Signs should be cleaned before placement. Refer to the ATSSA Quality Guidelines for Temporary Traffic Control Devices and Features.
Quality of Devices	0170-3488 D	Some of the devices were in poor condition, missing reflective tape and were dirty and scuffed.	Refer to the ATSSA Quality Guidelines for Temporary Traffic Control Devices and Features.
Quality of Devices	0170-3488 D	Majority of the signs were on waffle board substrate.	Waffle board signs should be removed and replaced in accordance with the specifications.
Quality of Devices	0171-0431	The TTC devices were deemed to be in good condition in general.	Refer to the ATSSA Quality Guidelines for Temporary Traffic Control Devices and Features for the acceptable condition.
Quality of Devices	0171-0442 A	Some cones are in marginal condition.	Refer to the ATSSA Quality Guidelines for Temporary Traffic Control Devices and Features for

CATEGORY	PROJECT NO.	FINDINGS	RECOMMENDATIONS
			acceptable condition of traffic devices.
Quality of Devices	0171-0442 A	All signs are mounted on waffle boards.	Signs need to be mounted on a rigid substrate so reflectivity isn't diminished.
Quality of Devices	0172-0478 G	Most of the signs were in marginal condition. They were scuffed with the lettering faded.	Refer to the ATSSA Quality Guidelines for Temporary Traffic Control Devices and Features for acceptable conditions for devices.
Quality of Devices	0174-0423 A	Some of the 36-inch cones were used to delineate the structures in the roadway, but the cones are deemed to be too short.	Use of the 42-inch cones can bring more visibility for delineation.
Quality of Devices	0174-0423 A	Most of the construction signs used had faded lettering and were in marginal or poor condition.	Devices in marginal or poor condition should be replaced with those in good condition so they can be clearly seen by motorists.
Quality of Devices	0173-0495 E	The Changeable Message Sign had some light bulbs out, cutting off part of the messaging.	Refer to the ATSSA Quality Guidelines for Traffic Control Devices and Features.
Quality of Devices	0174-0423 A	One traffic drum at an intersection used to delineate a structure was crushed at an intersection and knocked over.	Devices in poor quality should be removed from the project and replaced.
Quality of Devices	0063-0633	Traffic control devices and signs were in poor condition.	Refer to the ATSSA Quality Guidelines for Temporary Traffic Control Devices and Features to see the acceptable condition for devices.
Selective Clearing	0171-0431	Clearing is needed around signs next to trees.	Selective clearing should be done to ensure signs are clearly visible.
Specification Issues	0174-0403	The Liquidated Damages are deemed too low to be effective when trying to get the Contractor off the road.	Increasing the dollar amount of the Liquidated Damages can be more incentive for the Contractor to clear the road when needed.
Work Zone Interference	0084-0099/0100	Tree cutting operation dropped a tree on the roadway and it took about 10 to 12 minutes to open the road to a one-way alternating pattern after clearing the debris.	There needs to be a procedure in place for debris falling in work zone.
Work Zone Interference	0084-0099/0100	There was a trench behind the TPCBCs. There was about a 3+/- feet drop and less than one foot shelf behind the barriers. The available	The TPCBCs should be pinned to the pavement to protect the trench. <i>[Post Review: The barrier was shifted to allow a full foot behind it.]</i>

CATEGORY	PROJECT NO.	FINDINGS	RECOMMENDATIONS
		shelf was too short for the TPCBCs deflection zone.	
Work Zone Interference	0163-0203	The traffic plans had the stop bar at the edge of a driveway, making it difficult for buses to turn into and out of the driveway while cars stopped just beyond.	The project moved the stop bar back to allow better access to the driveway.

Summary

The successful practices and areas that require improvement found during the reviews will be addressed through training the inspection staff and the Biennial Work Zone Safety and Mobility Process Review which is required by federal regulation. The recommendations associated with the findings may be addressed as follows:

- Best practices can be implemented through specification changes, creation of new policies, and inspector training.
- Discrepancies found in the plans and specifications can be addressed through Lessons Learned presentations to the working level engineers or through construction bulletins.
- Modifications to existing policies and procedures for work zone field activities and common practices that pose a potential safety issue to the traveling public should be made.
- New policies can be created to address potential unsafe practices in the field.
- Training is the most effective tool to address systemic issues found in the field, such as specification enforcement and the acceptable quality of safety devices. Inspectors can be made aware of deficiencies verbally in the field, through the review reports, and during the winter inspectors' training. Another training resource is the use of the Inspectors' Pocket Guide Checklists.
- New technologies and materials are being researched and piloted to improve Work Zone Safety and Mobility. The latest emphasis is placing Radar Speed Display Trailers within the traffic pattern as a traffic calming measure.
- Timely communication between the Construction field staff and other Department units will yield effective project coordination in getting issues resolved.

The Work Zone Safety Field Reviews are instrumental in identifying how successful safety practices are functioning in the field and for receiving feedback from personnel who use them on a continuous basis. The Department will continue to benefit from implementation of these successful strategies for effective work zone safety and mobility.