

Oregon Work Zone Reviews

Summary Report

2019



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Introduction

As part of ODOT's statewide work zone safety and temporary traffic control program, jointly with the FHWA, the Work Zone Unit travels around the State conducting several, multi-day construction Work Zone Reviews. The 2019 Work Zone Reviews visited and reviewed 31 different highway construction work zones. Due to scheduling constraints FHWA was unable to accompany ODOT staff on this year's Work Zone Review, but was provide the opportunity to review and comment on the report.

The 2019 construction season provided a wide variety of work zones to review. Project locations ranged from the Oregon Coast to Eastern Oregon. Several projects completely closed the road to public travel, while others worked alongside high-speed, live traffic.

In conducting the Reviews, a number of Reviewers are invited to participate. Review participants are asked to score the work zones on a wide array of performance measures. Scores and comments are used to focus and heighten awareness of the many standards, practices, procedures and devices used in the design and implementation of ODOT's Traffic Control Plans. This report provides important feedback for statewide TCP Designers, ODOT engineering consultants and Region Construction Project Management staff. ODOT benefits from the Reviews by realizing measurable improvements in the quality and safety of the temporary traffic control plans used on its highway construction projects.

Objective

The purpose of the Work Zone Reviews is to:

- Confirm ODOT Temporary Traffic Control Design Standards and Practices are being implemented in the field consistently and uniformly.
- Confirm that the latest Standards and Practices are effective at providing a satisfactory level of safety for the traveling public and construction workers.
- Reveal additional techniques or technologies needed to improve overall safety, traffic flow and construction efficiency.
- Strengthen communication and working relationships between ODOT design and construction staff, consultants, and contractor employees.
- Identify current standard practices that need to be updated based on observations and feedback.

Methods

Since 2002, ODOT has been conducting detailed work zone reviews in an effort to strengthen the quality, efficiency and safety of its highway construction work zones. The Work Zone Reviews serve as a key element within the Agency's quality control and quality assurance programs. The Reviews allow designers, Safety staff, Project Coordinators and Construction personnel the opportunity to observe strengths and weaknesses within this unique and dynamic discipline.

Each Reviewer was asked to evaluate the condition and effectiveness of a variety of devices used within the work zone. Over 30 different "measures" are scored for each project visited. Scores are based on a scale of 1 (low) to 10 (high). A score of 4 or less warrants immediate contact with the ODOT Project Manager's office or an on-site agency representative to discuss the issue and possible mitigation strategies.

The Work Zone Review Evaluation Form (Figure 1) is used by Reviewers to record scores, notes and comments for each project visited.

This year's reviews were conducted over one week:

- Day 1: Regions 2 (central) and 3 (central)
- Day 2: Regions 3 (coast) and 2 (Coast)
- Day 3: Region 2 (North), 4, and 5
- Day 4: Region 1, 4, and 5
- Night 4: Region 1

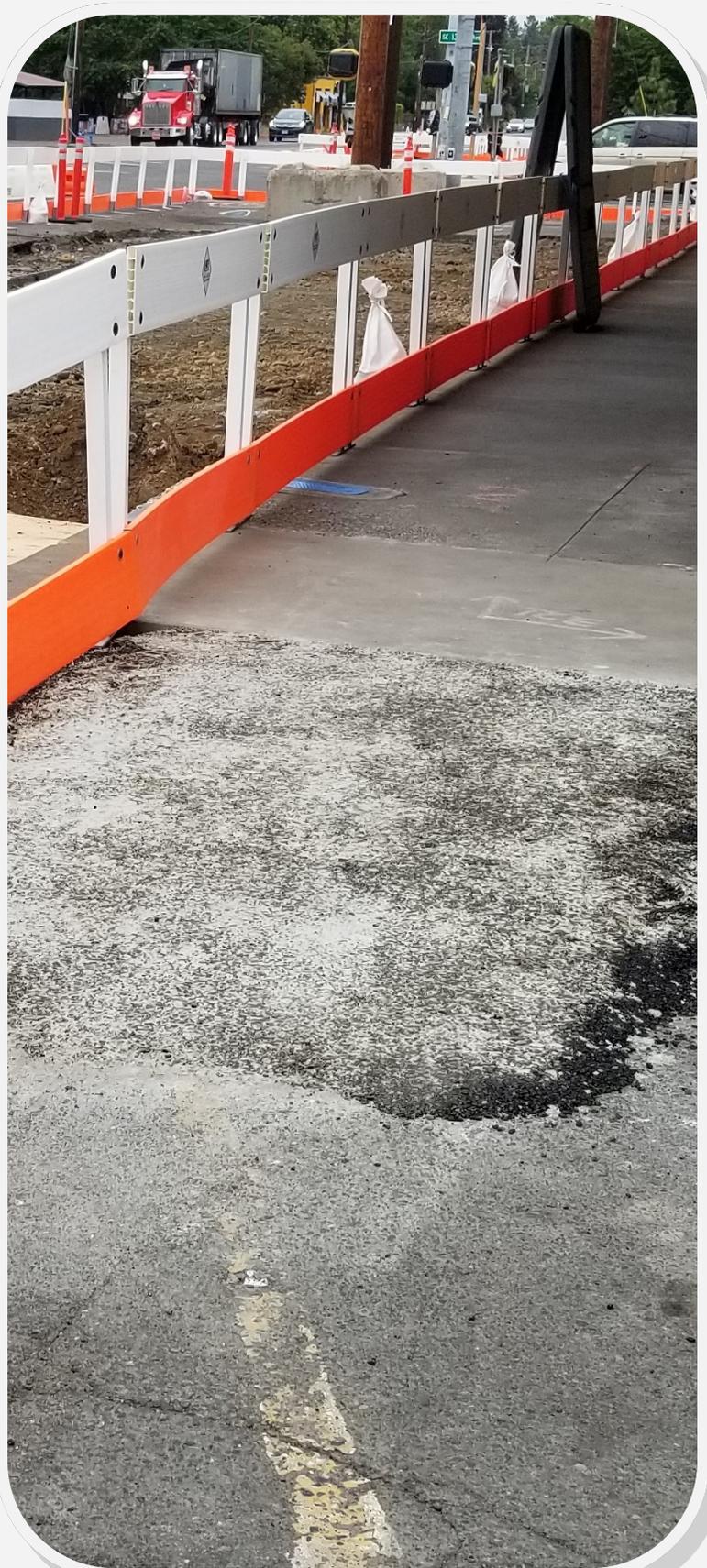
Evaluation Forms were collected from 31 different construction projects resulting in over 80 pages of scores and comments.

The amount of information and comments collected allows for a wide array of reports. Please contact the Work Zone Unit in Salem for additional information regarding reporting options and availability.

This year:

- 31 projects evaluated, spanning all five Regions.

Measures are scored as applicable for each project. If a device or condition was not present on a project at the time of the visit, a score was not given. For example, temporary concrete barrier may have been included in a particular contract, but if not in use on the project site at the time of the visit, "Temporary Concrete Barrier" (and likely, "Temporary Impact Attenuators") would not have been scored for that project.



Each of the following Measures are evaluated for each project visited:

Temporary Signing – Overall quality (design, condition), placement and spacing (visibility and legibility).

Channelizing Devices – Overall quality, condition, placement and effectiveness for tubular markers/ cones, drums, and barricades.

Pavement Markings & Markers – Overall quality (condition and visibility), placement and removal of temporary and permanent markings, where applicable.

Rigid Barrier Systems – Alignment, crashworthy installations, and quality of the barrier.

Reflective Barrier Panels – Condition (cleanliness and installation), effectiveness, and placement.

Temporary Impact Attenuators – Proper application and Quality (maintenance and placement).

Portable Changeable Message Signs (PCMS) – Effective placement, condition, and message quality.

Sequential Arrow Panels – Proper application, placement, and quality of the device.

Temporary Traffic Signals – Proper installation (design and layout), operation, and maintenance.

Bike/Ped/ADA Facilities – ADA compliance, adequate signing and devices; and, continuity through the project site (detours, diversions), pedestrian channelizing device.

Flaggers – Proper placement, effective devices and equipment; and, performance.

Pilot Cars – Appropriate application and performance.

Mobility – Effect of construction activities on traffic. Not exceeding specified delay limits.

Worker Garments & Equipment – Standard application of safety measures for workers and equipment on the jobsite.

Site Housekeeping – Work site cleanliness and orderliness.



Figure 1—Work Zone Reviews Evaluation Form

PROJECT NAME:		MAP #:	KEY #:	DATE:						
HIGHWAY:		MILEPOST:	REGION:	REVIEWED BY:						
PROJECT MANAGER:		OTHER CONTACTS:								
CONTRACTOR:		TCS								
GENERAL NOTES										
Only score Devices you witnessed on the Project. If a certain device was not present, do not score it.										
SCORING PROCESS: Only Score Devices/Categories witnessed on the project.										
NOTIFY PM (phone/email) or FIELD INSPECTOR !!										
1	2	3	4	5	6	7	8	9	10	
CATEGORIES		SCORE	COMMENTS							
TEMPORARY SIGNING		QUALITY								
<i>LOOK FOR:</i> Crashworthy design, supports, placement. Clean and visible. Legible, logical, efficient messages. Proper font size, sign color, design format.		PLACEMENT								
		SPACING								
CHANNELIZING DEVICES		TUBES, CONES								
<i>LOOK FOR:</i> Placement and alignment. Quality and cleanliness. Proper application. Reflectivity. Crashworthiness.		DRUMS								
		BARRICADES								
PAVEMENT MARKINGS		CONDITION								
<i>LOOK FOR:</i> Paint, Tape, Markers. Proper type, Placement, Alignment, Condition, Removal quality.		PLACEMENT								
		RIGID BARRIER SYSTEM		CONDITION						
<i>LOOK FOR:</i> Quality, Alignment, Pinned together. Secured to pavement, where necessary.		PLACEMENT								
		REFLECTIVE BARRIER PANELS: Y or N		CONDITION						
IMPACT ATTENUATORS		CONDITION								
<i>LOOK FOR:</i> Sand barrels, Narrow-site, TMA. Proper Installation. Maintenance. Correct Design Speed.		PLACEMENT								
		PORTABLE CHANGEABLE MESSAGE SIGNS		MESSAGE	PCMS 1: PANEL 1		PANEL 2		PCMS 2: PANEL 1	
<i>LOOK FOR:</i> Clear, Legible, meaningful Messages. Visible @ Location. Good working order. (Use Back for more)		LOCATION								
		CONDITION								
SEQUENTIAL ARROW PANEL ("Arrow Board")		PLACEMENT								
		CONDITION								
		TEMP. TRAFFIC SIGNAL (Span wire) ; or PORTABLE TRAFFIC SIGNAL		SET-UP						
		CONDITION								
		BICYCLE, PEDESTRIAN, ADA COMPLIANCE		SIGNING						
<i>LOOK FOR:</i> Signing, PCD or other Channelizers, Smooth surfaces, Adequate widths, Temp. Curb Ramps. Bicycle accommodation where facility impacted.		PCD, RAMPS								
		ACCESSIBILITY								
FLAGGERS		VISIBILITY								
<i>LOOK FOR:</i> Clean, reflective ANSI Class II garments. Proper hats, radio, Stop/Slow paddle. Hand signals,		PERFORMANCE								
		PILOT CARS		EQUIPMENT						
<i>LOOK FOR:</i> Driving 35 mph or less. Warning lights. Clean, visible "PILOT CAR FOLLOW ME" sign.		PERFORMANCE								
		MOBILITY		TRAFFIC FLOW						
Time Stopped At Flagger or Temp. Signal:		Minutes								
		Temp. Speed Reduction? FROM: _____ TO: _____	MPH							
WORKER GARMENTS & SAFETY EQUIPMENT		GARMENTS								
<i>LOOK FOR:</i> Clean, Class II vests (If in ROW). Hardhats. Fall protection, Trench shoring (over 5-ft)		EQUIPMENT								
		GENERAL SITE HOUSEKEEPING		CLEAN, ORDERLY						
POLICE ENFORCEMENT		On-Site? Y or N								
<i>Is Law Enforcement on site or in WZ? Are there OT Hours?</i>		OT? Y or N								
		DRIVER-FRIENDLY WORK ZONE		Meet Driver Expectancy?						
<i>Clearly delineated path through WZ? "Surprises,"? Conditions straining Driver Expectancy?</i>		Ease of Navigation								
		FINAL SCORE =		÷	=	AVG. SCORE of				

Results

Results from the scores of the different Reviewers for the 31 projects are used to develop the project and measure scores. Project scores are combined and averaged based on the number of participants submitting an Evaluation Form. Overall average project scores are calculated for each Region and are compared to scores collected since 2002 (Figures 3 through 7).

Measure Scoring Summary

Figure 2 shows the statewide average score for each work zone measure. Figure 2 can be used to identify measures (devices, practices) needing additional attention at the design and/or implementation phase of the project. It also identifies measures that are meeting or exceeding road users' expectations.

Of the 31 measures, all but 2 received an average score of at least 7.0. Seven of the measures received average scores above 7.5.

Measures that consistently received the highest average scores for 2019 are:

- Rigid Barrier System - Condition, 7.9
- Mobility - Overall Flow, 7.8
- Temporary Signing - Quality, 7.7
- Portable Changeable Message Signs (PCMS) - Placement, 7.7
- Portable Changeable Message Signs (PCMS) - Condition, 7.6
- Impact Attenuators- Condition, 7.6
- Channelization Devices - Drums, 7.6

Measures that consistently received the lowest average scores for 2019 are:

- Flaggers – Performance, 6.7
- Temp. Traffic Signals - Setup, 6.8
- Sequential Arrow Panel - Placement, 7.0
- Flaggers – Visibility, 7.0

Figure 2 — Average Measure Scores

SCORED MEASURES FOR THE STATE	
RIGID BARRIER SYSTEM: CONDITION	7.9
M O B I L I T Y : O V E R A L L F L O W	7.8
TEMPORARY SIGNING: QUALITY	7.7
PORTABLE CHANGEABLE MESSAGE SIGNS (PCMS): PLACEMENT	7.7
PORTABLE CHANGEABLE MESSAGE SIGNS (PCMS): CONDITION	7.6
IMPACT ATTENUATORS: CONDITION	7.6
CHANNELIZATION DEVICES: DRUMS	7.6
TEMP. TRAFFIC SIGNALS: CONDITION	7.5
REFLECTIVE BARRIER PANELS: CONDITION	7.5
WORKER GARMENTS & EQUIPMENT: GARMENTS	7.5
WORKER GARMENTS & EQUIPMENT: EQUIPMENT	7.5
SITE HOUSEKEEPING: CLEAN, ORDERLY	7.5
TEMPORARY SIGNING: PLACEMENT	7.5
Average = 7.45	
TEMPORARY SIGNING: SPACING	7.4
RIGID BARRIER SYSTEM: PLACEMENT	7.4
BICYCLE, PEDESTRIAN & ADA FACILITIES: Ped. Chann. Dev.	7.4
SEQUENTIAL ARROW PANEL: CONDITION	7.3
CHANNELIZATION DEVICES: BARRICADES	7.3
IMPACT ATTENUATORS: PLACEMENT	7.3
BICYCLE, PEDESTRIAN & ADA FACILITIES: SIGNING	7.3
PAVEMENT MARKINGS: CONDITION	7.2
CHANNELIZATION DEVICES: TUBES/CONES	7.2
BICYCLE, PEDESTRIAN & ADA FACILITIES: ADA COMPLIANCE	7.2
PAVEMENT MARKINGS: PLACEMENT	7.1
PORTABLE CHANGEABLE MESSAGE SIGNS (PCMS): MESSAGE	7.1
FLAGGERS: VISIBILITY	7.0
SEQUENTIAL ARROW PANEL: PLACEMENT	7.0
TEMP. TRAFFIC SIGNALS: SETUP	6.8
FLAGGERS: PERFORMANCE	6.7
PILOT CARS: EQUIPMENT	-
PILOT CARS: PERFORMANCE	-

Statewide Scoring Summary

The 2019 Work Zone Reviews reviewed 31 projects. The statewide average project score increased from previous years and was the highest it has been since 2009.

The statewide average project score of 72* equates to a rating of, "Above Average" based on the current scoring system. The above average rating confirms that the TCP Standards and Practices are mostly effective and being implemented a majority of the time. The lowest scored project was also higher than any other low score in the last 10 years. The improvement in score to previous years is also a good sign that TCP Standards and Practices are still on the right track.

* Raw scores ("out of 10") are converted to scores based on 100 for annual comparison purposes.

The Measures scored during the Reviews are averaged and ranked. No Work Zone Reviews were conducted in 2014, 2016, or 2018 (See Figures 3 through 6).

Figure 3—Annual Scores

2019 WORK ZONE SAFETY AUDIT SUMMARY REPORT - SCORING STATISTICS by YEAR											
	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
TOTAL PROJECTS REVIEWED	60	42	43	29	29	-	39	-	30	-	31
HIGH SCORE	88	74	75	80	76	-	80	-	76	-	82
AVERAGE SCORE	76	67	69	71	67	-	69	-	66	-	72
LOW SCORE	62	53	57	57	50	-	30	-	49	-	67

Figure 4 - 2019 # of Projects

PROJECTS SCORED per REGION	
Region 1	6
Region 2	11
Region 3	7
Region 4	2
Region 5	5

Figure 5 – 2019 Project Average Scores

SCORE	# of Projects	% of Projects
≥ 8.0	5	15.5%
7.5 - 8.0	7	22.0%
7.0 - 7.5	16	50.0%
< 7.0	4	12.5%

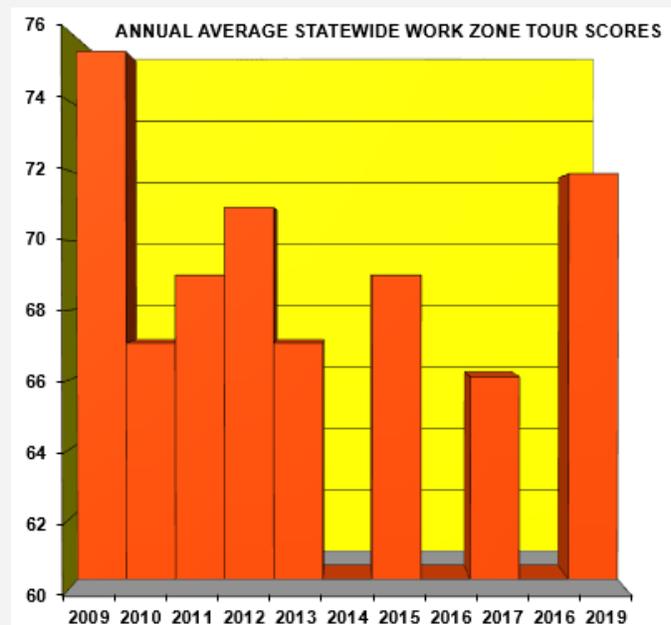


Figure 6—Annual Scores graph

RECOMMENDATIONS

The annual Work Zone Reviews revealed a number of consistencies, improvements and positive comments. However, substandard quality control issues were observed – some new, some recurring. Comments and Measure scores from this year, and comparative 2017 measure rankings, were used to identify TCP strengths and deficiencies for 2019.

TCP Strengths for 2019 included mobility and the accommodation of traffic through our work zones and the apparel of construction workers, as well as the usage of rigid barrier systems and temporary signing.

TCP Deficiencies for 2019 included flaggers and temporary traffic signals. In addition, sequential arrow panels and pavement markings showed declines in quality and effectiveness. Aside from these deficiencies during the reviews, only one isolated project needed immediate attention to the traffic control devices being used. Project Management staff were prompt and cooperative in responding to needed changes.

Several extraordinary examples of temporary traffic control measures were encountered during the safety reviews, as shown below.

MEASURE	Statewide Ranking		+/-
	2017*	2019	
MOBILITY	2	1	
RIGID BARRIER SYSTEM	5	2	+
APPAREL	7	3	+
TEMPORARY SIGNING	8	4	+
SITE HOUSEKEEPING	9	5	+
PCMS	6	6	
IMPACT ATTENUATORS	11	7	+
CHANNELIZATION DEVICES	12	8	+
BICYCLE/PED/ADA	13	9	+
PAVEMENT MARKINGS	4	10	-
SEQUENTIAL ARROW PANEL	10	11	
TEMP. TRAFFIC SIGNALS	1	12	-
FLAGGERS	3	13	-
PILOT CARS	-	-	

*No data for 2018

Figure 7 - Year Comparison



(Above) Temporary Steel Barrier



(Below) Temporary crosswalk installed to accommodate pedestrian crossings on I-84 Graham Road Bridge Replacement Project

Statewide: Efforts to accommodate pedestrians in work zones.





Bike/Pedestrian/ADA TCP Action

A 2017 Work Zone review action item was to continue the Bike/Pedestrian/ADA Action Item from 2015. The TCP Unit action item was continue to educate ODOT staff, consultants, and other groups about the use of new measures for ADA compliant design. Along with this task was to also make design of ADA features easier and for the new standards to be implemented correctly in design and construction.

The TCP unit has scheduled a monthly meeting to help towards this task. The TCP unit holds a meeting to go over any changes, new standards, and any questions anyone in the process of a project might have. This is an open meeting and any one is welcome to attend. So far the TCP unit has reached out and invited designers, utilities, permit specialists, and project managers from ODOT staff. Outside of ODOT some Local Agencies and consultants have been personally invited, but all are welcome. Any one is welcome to bring questions to the meeting and it has been helpful to the designers attending. The TCP unit is still continuing to develop new standards for bike/pedestrian/ADA design. Things that have been added or are being worked toward are improved availability of temporary pedestrian surfaces, updating specifications to make design and construction easier, and completing a work zone tour that focuses on Temporary Pedestrian Accessible Routes (TPARs).

Impact Attenuators TCP Action

A 2017 Work Zone review action item was to educate designers and construction staff on when an impact attenuator is needed. Along with this task the TCP Unit was tasked with looking at guidance on impact attenuators in the TCP Design Manual and updating as needed.

To work towards completing this action item the TCP Unit attended a Project Managers meeting and Inspector training. At these events the TCP Unit presented to those groups on the proper use of impact attenuators and when they are needed. There was also a Standard Drawing for impact attenuators added to help with project design.

In the 2019 Work Zone tour the scores for Impact Attenuators increased from “Average” to “Above Average” and there were very few occasions where the use of an impact attenuator was wrong or missing.

Work Zone Traffic Control Safety Review “Strengths”

1. Rigid Barrier Systems

Temporary Rigid Barrier Systems are used to provide positive separation between traffic and the work area, effective protection for the construction workers, protect opposing traffic streams, and protect vehicles from road hazards.

Throughout the various projects tour almost all uses of rigid barriers were aligned well and were in good condition. This made the roadway easier to follow, especially for temporary alignments that added new curvature to the road. The barriers adequately provided protection to the work area for the construction crews on all projects.

There was a mix of concrete barriers and steel barriers used successfully. There were also some good uses of reflective barrier panels on each type of rigid barrier. Reflective barrier panels are required for sections of barrier that have curvature. Typical uses for use of reflective barrier panels are free-way crossovers and lane closure over bridges. Although not required for barrier in straightaways reflective barrier panels may be used at the discretion of the designer. The reflective barrier panels helped make the location of the barriers stand out well in the dark (photo to the right).



2. Mobility

ODOT continues to place strong emphasis on Mobility through its work zones. Mobility is actively managed by setting and modifying lane closure restrictions. The coordination of travel delay within the Region also plays an important piece of the mobility puzzle.

ODOT’s emphasis on mobility was evident in the majority of projects visited during the Safety Review. Most freeway projects had minimal delays, even when they included temporary speed reductions. The majority of work zones controlled by flaggers had minimal delays as well.

Mobility was a strength in the 2017 Work Zone Report as well. Mobility continues to be one of ODOT’s strengths through the construction process. The balance of mobility, safety, and productivity will continue throughout projects in the future.



Work Zone Traffic Control Safety Review “Deficiencies”

1. *Flaggers*

Flaggers are used to control the flow of traffic in and around the work zone. Flaggers are used on a wide variety of projects and that was true for this 2019 Work Zone Tour. Flaggers were used for the following activities on this years tour: main-line full depth reconstruction and paving, culvert replacement, bridge rehabilitation, and roadway realignment.

In this years work zone tour flaggers were on the bottom end of scores which is a big change from last year where flaggers were towards the top end of scoring. There seemed to be lack of quality control on flaggers in the 2019 work zone tour. Some of the deficiencies of the flaggers were flagger being distracted, no escape route for the flagger, flagger not clearly visible, and improper location for the flaggers vehicles.

There were multiple occurrences of each of these deficiencies around the state. These operations were all being run successfully, but there is room for improvement in the quality of the operation. When any of these deficiencies are present the safety of the flagger and operation of the project are decreased. It is important that the flagger is visible, paying attention, and has an escape route available.

TCP Action

To address this action item the TCP unit will review the training that is being provided to flaggers and make sure it is up to date and covers all of the above deficiencies. The TCP Unit will also meet with the ODOT Project Managers and Inspectors and review with those groups what the standards are for a flagging operation and what they should be doing to make sure the flaggers are operating safely. Along with this ODOT is also increasing the education and training around Automated Flagger Assistance Devices (AFAD's). Increased use of AFAD's will result in less reliance on flaggers.



2. *Sequential Arrow Panels*

Sequential Arrow Panels are used to indicate the direction traffic needs to merge as part of a lane closure. There were many projects on this tour that used Sequential Arrows. The sequential arrow panels are important for warning drivers of the action they need to take and help increase the safety of a construction zone.

In the 2019 Work Zone Tour there were some very good uses of the sequential arrow panels, but also some occasions where there was room for improvement. Some of the contributing factors witnessed in the tour to this item being on the bottom of scoring are as follows: the sequential arrow was placed on a vertical or horizontal curve, the sequential arrow was not aligned correctly, and that the arrow had lights out.

It is important that the sequential arrows be visible. Many projects placed sequential arrows on horizontal or crest vertical curves, not providing drivers adequate sight distance to view the arrows and prepare to merge lanes.

TCP Action

Sequential Arrow Panels are important for warning traffic of a merge situation. With many of these being placed on high speed interstates it is important they are clearly visible. The TCP unit will talk to the ODOT designers to remind them to be mindful of the roadway curvature for locations of sequential arrow panels in plans. The TCP Unit will also review their technical guidance for the placement of sequential arrow panels, especially on curvature.



Work Zone Traffic Control Review

Traffic Control Supervisor (TCS)

For the seventh year, measure scores were examined to determine if the average score of a given performance measure was affected by the inclusion of a TCS in the contract. In Figure 9, 2019 results slightly favor the omission of a TCS in a contract. TCS are usually required in more complex projects, so this may explain some of the results. Over the past three reports, from 2015 through 2019, the projects with no TCS in the project contract have scored higher. Results do not take into account that TCS are generally reserved for complex projects or projects with frequent changes in traffic control.

Figure 8 -TCS Statistics Comparison

MEASURE	TCS	NO TCS
TEMPORARY SIGNING	7.42	7.70
CHANNELIZATION DEVICES	7.17	7.59
PAVEMENT MARKINGS	6.92	7.41
RIGID BARRIER SYSTEM	7.69	7.67
IMPACT ATTENUATORS	7.44	8.02
PCMS	7.52	7.46
SEQUENTIAL ARROW PANEL	7.26	7.20
TEMP. TRAFFIC SIGNALS	0.00	7.50
BICYCLE/PED/ADA	7.45	7.33
FLAGGERS	7.25	6.67
PILOT CARS	0.00	0.00
MOBILITY	7.73	7.94
WORKER GARMENTS	7.60	7.53
SITE HOUSEKEEPING	7.35	7.58

Project-Specific Plan Sheets vs. Standard Drawings

It should be noted that some projects would not warrant the development of project-specific TCP sheets, nor would those projects that clearly demand TCP sheets benefit from relying solely on Standard Drawings. Some TCP measures are almost always shown on a plan sheet due to the nature and function of the device (e.g. concrete barrier, temp. traffic signals). Further, this comparison is being made to examine the relationship between the level of detail in the TCP and its effectiveness during implementation. Resulting data may determine if individual measure effectiveness could be improved with more detail or clarity provided by project-specific plan sheets.

In the 2019 Work Zone Tour there were only two projects, of the 31 reviewed, with plans that were Standard Drawings only and did not have project specific plan sheets. With this small of a number it is hard to make a statistical comparison. What this may show is that more projects have projects specific plans. This may be due to the increased requirements for Temporary Pedestrian Accessible Routes plans.

Figure 9 - Plans Comparison

MEASURE	PLANS	NO PLANS
TEMPORARY SIGNING	7.55	7.83
CHANNELIZATION DEVICES	7.35	8.00
PAVEMENT MARKINGS	7.15	8.33
CONCRETE BARRIER	7.68	0.00
IMPACT ATTENUATORS	7.69	7.67
PCMS	7.43	7.56
SEQUENTIAL ARROW PANEL	7.19	7.17
TEMP. TRAFFIC SIGNALS	7.50	0.00
BICYCLE/PED/ADA	7.27	7.83
FLAGGERS	6.90	0.00
PILOT CARS	0.00	0.00
MOBILITY	7.87	7.17
WORKER GARMENTS	7.56	7.32
SITE HOUSEKEEPING	7.44	7.83

CONCLUSION

The 2019 Work Zone Reviews were again a success in identifying strengths and weaknesses within ODOT's TCP standards and practices and the implementation of those practices in our contracts. The Reviews gave us the opportunity to review 31 different State highway construction work zones. The action items of the 2017 reviews were accomplished, and ODOT continues to improve the practice of temporary traffic control across the State of Oregon.

The Reviews helped us meet some important goals:

- Confirmed ODOT Temporary Traffic Control Design Standards and Practices are largely being implemented in the field with consistency and uniformity.
- Confirmed the latest Standards and Practices are effective at providing a satisfactory level of safety for the traveling public and construction workers.
- Revealed additional techniques and technologies needed to improve overall safety, traffic flow, and construction efficiency.
- Strengthened communication and working relationships between ODOT design and construction staff, consultants, and contractor employees.
- Identified current standard practices that need updating based on observations and feedback.

An important additional benefit from the Work Zone Reviews is seeing recurring "Deficiencies." We can prioritize and more closely analyze these features for solutions to improve the overall design and implementation of our work zone traffic control plans. 'Lessons learned' can be shared between all TCP designers and construction personnel in efforts to reduce repeat "Weaknesses".

The Traffic Control Plan Unit would like to thank each of the Reviewers who helped with the monumental task of improving safety in Oregon work zones. Thank You.





Oregon Department of Transportation Traffic Control Plans Unit

Traffic Standards & Asset Management Unit, MS #5
4040 Fairview Industrial Drive SE
Salem, Oregon 97302-1142

Justin King, PE
State Traffic Work Zone Engineer
503.986.3584
justin.s.king@odot.state.or.us

Frank Belleque, PE
Traffic work Zone Analyst
503.986.3791
frank.belleque@odot.state.or.us

Fahad Alhajri, PE
Traffic Work Zone Standards Engineer
503.986.3788
Fahad.alhajri@odot.state.or.us

Kevin Haas, PE
Traffic Standards Manager/Engineer
503.986.3583
Kevin.J.Haas@odot.state.or.us



U.S. Department
of Transportation

Federal Highway Administration

FHWA Oregon Division
530 Center Street NE, Suite 420
Salem, Oregon 97301
<http://www.fhwa.dot.gov/ordiv/index.htm>

Nick Fortey, PE
FHWA(Oregon) Programs Manager
503.316.2565. Nick.Fortey@dot.gov