

AGC/MoDOT Annual COOP Meeting

December 5, 2018

Safety/Traffic Division & Specialty
Contractor/Suppliers
Breakout Session



2:00 Work Zone Reviews

2:45 Smart Work Zones

3:00 Fall Projection

3:30 Autonomous TMA

4:00 Updates on Specs

4:10 Discussion Topics

4:30 Adjourn





Specification and Standard Plan Changes



Construction Vehicle Lighting



- Use of red/blue lights in work zones – added to Supplemental Job Special Provision December 2017
- In accordance with RSMo 307.175 regarding sirens and flashing lights
- Fixed, flashing, or rotating red/blue lights may be used by a contractor in a work zone:
 - between dusk and dawn
 - on stationary vehicles/equipment only
 - on no more than two vehicles/pieces of equipment per work zone
- Amber/white fixed, flashing, or rotating lights shall be used during daytime and nighttime work zone operations on vehicles on the road:
 - daytime – SAE Class 1 or 2 lights shall be used
 - nighttime (dusk to dawn) – SAE Class 2 lights shall be used
- The awarded contract will serve as a written permit to use red/blue lights



Job Special Provision



616.5 Lighting Requirements.

616.5.1 Amber or Amber and White Warning Lights. All on-road construction-related vehicles and equipment shall operate with amber or amber and white warning lights having 360 degrees of total coverage and as follows:

- (1) For daytime operations, SAE Class 1 or 2 lights shall be used.
- (2) For dusk to dawn operations, SAE Class 2 lights shall be used, or SAE Class 1 lights with dimming capabilities to minimize glare experienced by travelers.

616.5.1.1 Red or Red and Blue Warning Lights. The contractor may elect to use red or red and blue warning lights in accordance with Missouri law and the following requirements:

- (1) Use of red or red and blue lights shall be limited to use on a total of two vehicles per work zone and/or project.
- (2) Use of red or red and blue warning lights shall be limited to areas in advance of tapers or lane shifts and at the active work zone location.
- (3) Lights shall be SAE Class 2 or SAE Class 1 with dimming capabilities to minimize glare experienced by travelers.

The awarded contract will serve as a permit by the Commission, granting the prime contractor and approved sub-contractors to utilize red or red and blue lights as required by Missouri law.

AGCMO





Temporary Rumble Strips

Short-term Temporary
Rumble Strips



Long-term Temporary
Rumble Strips





Temporary Rumble Strips

- We have completed a pilot study for the use of temporary rumble strips on MoDOT Maintenance projects
- Currently piloting on contract/construction projects
 - To determine the types of projects temporary rumble strips are applicable to and
 - Type of temporary rumble (short-term or long-term) for type of project
- Current specifications are in Job Special Provisions
- Plan sheet guidance in EPG 616.6

Biggest complaint from workers: short-term rumbles are too heavy

Biggest complaint from contractors: cost of short-term rumbles is really high for orange

Biggest rewards: alerts distracted drivers, drivers slow down, less injuries and fatalities in work zones



Figure: 616.6.87.1 Temporary Rumble Strip Placement in Flagging Operations

www.invarion.com

SPEED	SIGN SPACING (ft.)		TAPER LENGTH (ft.)		OPTIONAL	CHANNELIZER SPACING (ft.)	
Permanent Posted (mph)	Undivided (S)	Divided (S)	Shoulder (T1)	Lane (T2)	BUFFER LENGTH (ft.) (B)	Tapers	Buffer/ Work Areas
0-35	200	-	-	-	280	-	40
40-45	350	-	-	-	400	-	80
50-55	500	-	-	-	560	-	80
60-70	1000	-	-	-	840	-	120

NOTES:

See EPG 616.6.87 Temporary Rumble Strips for rumble strip guidance and locations.

Flagging operation can include human flaggers, automated flagger assistance devices, portable signal flagging devices and traffic control signals operations.

Review appropriate typical applications for signs, sign spacing, taper length, buffer length, channelizer spacing, TMAs, etc.

Temporary rumble strips shall be orange in color.

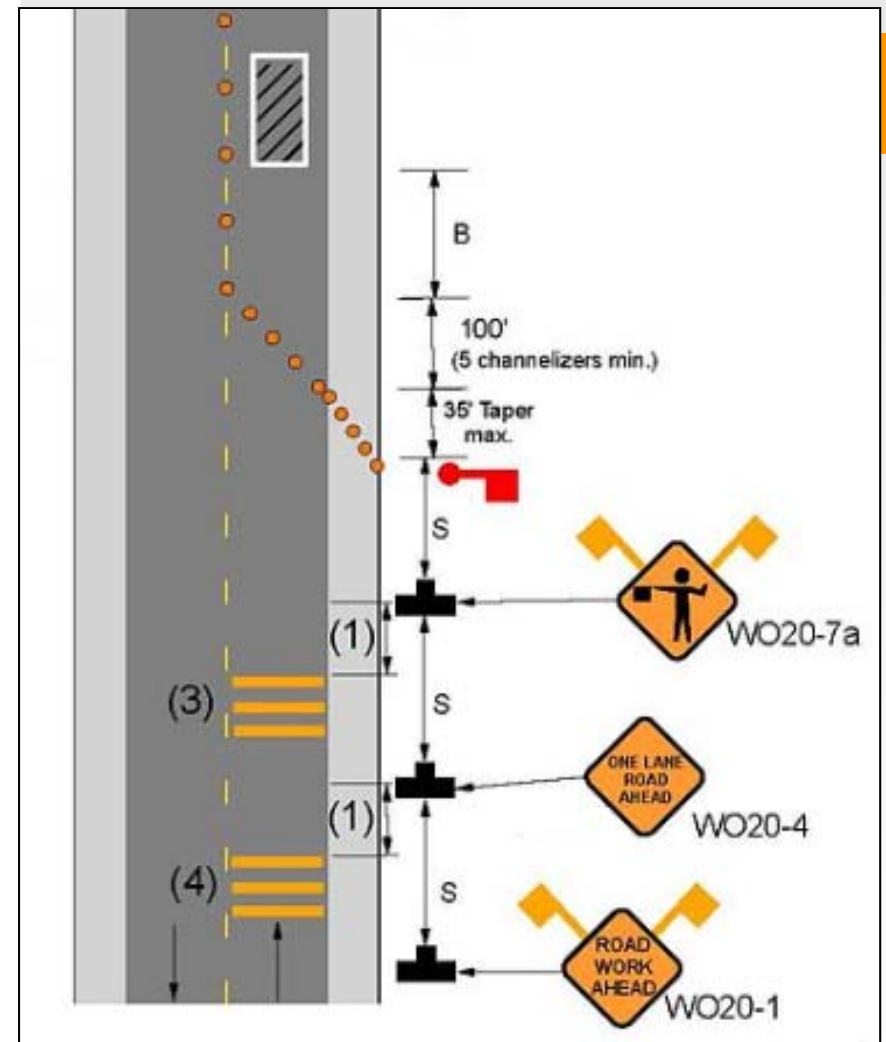
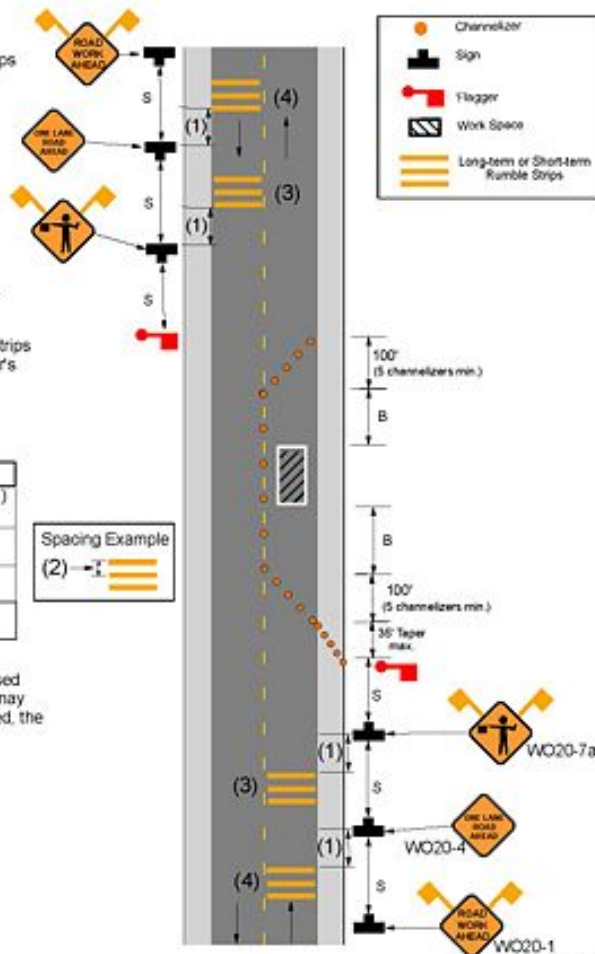
Long-term rumble strips shall consist of 5 strips separated at 2-4 ft, centers or manufacturer's recommendation.

Short-term rumble strips shall consist of 3 strips.

Short-term Rumble Strips		
Speed (MPH)	Distance (ft.) (1)	Spacing (ft.) (2)
0 - 45 (Optional)	120	10
50 - 55	160	15
60 - 70	200	20

Spacing Example
(2) →

Two sets of rumble strips (3 & 4) may be used simultaneously or one set of rumble strips may be used. If one set of rumble strips are used, the preferred placement is at location (3).



Figures in the Engineering Policy Guide – same location for both short and long-term rumble strips; different spacing between and number of rumbles.

Optional Temporary Pavement Marking



Non-standard JSP for Optional Temporary Pavement Marking October 2018

- **Provides the contractor an option to complete all permanent pavement marking paint by dates established in JSP OR apply temporary pavement marking paint in accordance with 620.10.2**
- **If temporary paint is used, permanent paint application can be delayed until after March 1st.**

The JSP helps contractors better schedule MoDOT pavement marking around other city and county pavement marking commitments.

- **Can bid the temporary pavement marking pay item but still have the option to complete permanent pavement marking prior to October 1st; in which case the full payment for the temporary pavement marking would still be made even if not used.**
- **OR not bid the temporary item and have to meet the October 1st deadline**





Temporary Concrete Barrier

Std. Plan 617.20 was updated July 2018 to clarify pavement types tie-down straps and pins can be used.

- **Tie-down straps are to be used on rigid pavements only.**
- **Pins may be used with rigid, flexible, or composite pavements.**
- **Two-loop temporary concrete barrier traditionally do not have anchor/pin holes; these are best suited for tie-down strap operations on concrete.**
- **There are instances where anchoring the barrier is not required (see deflection tables on sheet 8 or 8 Std. 617.20).**

LIMITS OF UNPROTECTED AND UNSHIELDED AREA	
$6'' \leq A < 2'$	ANCHOR EACH BARRIER WITH 3 ANCHOR BOLTS OR PINS
$2' \leq A < 3'$	ANCHOR WITH BOLTS, PINS, OR TIE-DOWN STRAPS
$A \geq 3'$	NO ANCHORAGE REQUIRED UNLESS SHOWN ON PLANS

EDGE OF DROP OFF	
$1'' \leq B < 6''$	ANCHOR EACH BARRIER WITH 3 ANCHOR BOLTS OR PINS
$6'' \leq B < 2'$	ANCHOR WITH BOLTS, PINS, OR TIE-DOWN STRAPS
$B \geq 2'$	NO ANCHORAGE REQUIRED UNLESS SHOWN ON PLANS

NOTE: TEMPORARY CONCRETE TRAFFIC BARRIER MUST MEET BOTH A AND B DIMENSIONS, UNLESS OTHERWISE SHOWN ON PLANS.





Discussion Topics / Submitted Questions





Question 1.

Discuss the Prime Contractors responsibility to insure that Subs perform traffic control appropriately and wear the appropriate PPE. Striping, rumble strips and other moving operations are the bigger challenges now.





Answer 1.

Traffic Control

- The prime contractor is responsible for all actions of their subcontractors.
- Section 616.3.3 (a) – requires prime to employ a certified Work Zone Specialist (WZS) who has the primary responsibility to implement the Traffic Management Plan and to be directly involved with daily traffic management.
 - For all pre-activity meetings that include the need for traffic control, the WZS should lead discussion of what will be required for traffic control plan.

Answer 1.



PPE

- The prime contractor's on-site project superintendent is responsible for ensuring all employees, including subs are equipped with PPE before work begins.
- If PPE is not used
 1. Inspector issues verbal warning to project superintendent
 2. For repeat violations, the inspector should issue a NCR to the contractor's Project Manager
 3. If problem persists, a stoppage of work Order Record should be issued along with a Corrective Action request.



Question 2.

Discuss the role expected of contractors Work Zone Specialists (WZS) and MoDOT's QA concerning the work zone.

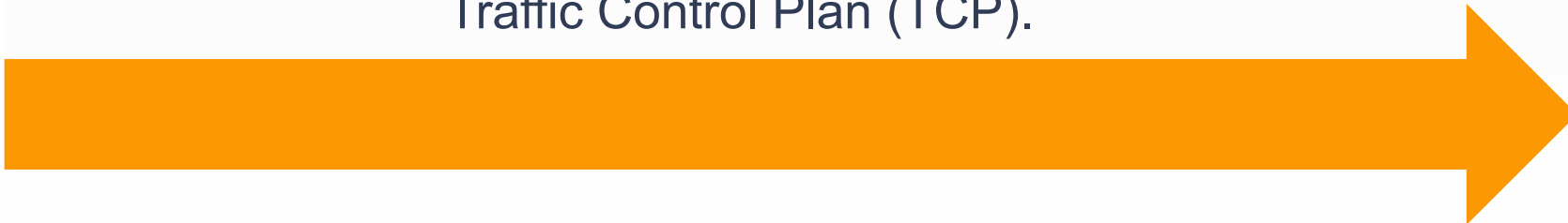


Answer 2.



Work Zone Specialist

- Primary role is defined in Section 616.3.3(a) and is applicable to all projects.
- The Work Zone Management JSP lists additional duties of the WZS that are generally only necessary for work on high volume routes or activities that may cause delays.
- For all pre-activity meetings that include the need for traffic control, the WZS should lead the discussion on the details of what will be required to implement the Traffic Control Plan (TCP).





616.3.3 The contractor shall:

(a) Designate an individual as the Work Zone Specialist (WZS) who is knowledgeable and competent by training and/or certification in the principles of proper temporary traffic control in accordance with Chapter 6 of the MUTCD, and who has the primary responsibility, with sufficient authority, for implementing the traffic management plan and other safety and mobility aspects of the project. The WZS shall be directly involved with daily traffic management, and shall communicate pertinent information with the engineer either in person or via telecommunication. Duties of the WZS shall include monitoring the work zone to ensure an efficient flow of traffic, correcting any failed or misaligned traffic control signs or devices, and recommending traffic management improvements to the engineer. The name, certification, and a 24-hour contact number for the WZS shall be provided to the engineer prior to the start of work. If the contractor makes a change in the designated WZS, the engineer shall be notified immediately. The WZS shall be trained and certified by a qualified person as defined by the Occupational Safety and Health Administration. The WZS shall have a card and/or certificate that includes the WZS's name, instructor's name and title, training entity/agency, date of training, and signature of the instructor. Re-certification shall be required a minimum of every four years.





1.1 Maintaining Work Zones and Work Zone Reviews. The Work Zone Specialist (WZS) shall maintain work zones in accordance with Sec 616.3.3 and as further stated herein. The WZS shall coordinate and implement any changes approved by the engineer. The WZS shall ensure all traffic control devices are maintained in accordance with Sec 616, the work zone is operated within the hours specified by the engineer, and will not deviate from the specified hours without prior approval of the engineer. The WZS is responsible to manage work zone delay in accordance with these project provisions. When requested by the engineer, the WZS shall submit a weekly report that includes a review of work zone operations for the week. The report shall identify any problems encountered and corrective actions taken. Work zones are subject to unannounced inspections by the engineer and other departmental staff to corroborate the validity of the WZS's review and may require immediate corrective measures and/or additional work zone monitoring.





Answer 2.

MoDOT QA Role

- To attend the pre-activity meeting
- To ensure all pertinent planning aspects of traffic control and management are covered.
- Monitor the work zone to ensure WZS is properly implementing the TCP and TMP





Question 3.

Should the specs or the Contractor QC procedures be revised to require a hold point for video/mandrel inspections prior to allowing paving to proceed. We have seen several instances of deficient pipe that in some cases is impossible to fix.





Answer 3.

The following Hold Point has been posted to the MoDOT QC web page.

- For Group A, B, and sometimes C culvert pipes installed under pavement a hold point is required in order for QC to perform manual or video inspection and to record measurements in accordance with Sec 724.3.
- For culverts installed elsewhere, the hold point and inspection shall occur no sooner than 30 days after completion of the grade.





Question 4.

Need a quick overview of the standard changes made concerning the pinning or strapping of temporary concrete barrier.



Answer 4.

Std. 617.20 was updated July 2018 to clarify pavement types tie-down straps and pins can be used.

- Tie-down straps are to be used on rigid pavements only.
- Pins may be used with rigid, flexible, and composite pavements.
- Two-loop temporary concrete barrier traditionally do not have anchor/pin holes; these are best suited for tie-down strap operations on concrete.
- There are instances where anchoring the barrier is not required (see deflection tables on sheet 8 or 8 Std. 617.20).





Question 5.

There have been multiple jobs this year that call for rip rap elements for the slide repair fixes in which extremely large rip rap is being placed underneath the guardrail or sometimes underneath the roadway itself. Guardrail cannot be driven through large rocks and can't be drilled either.





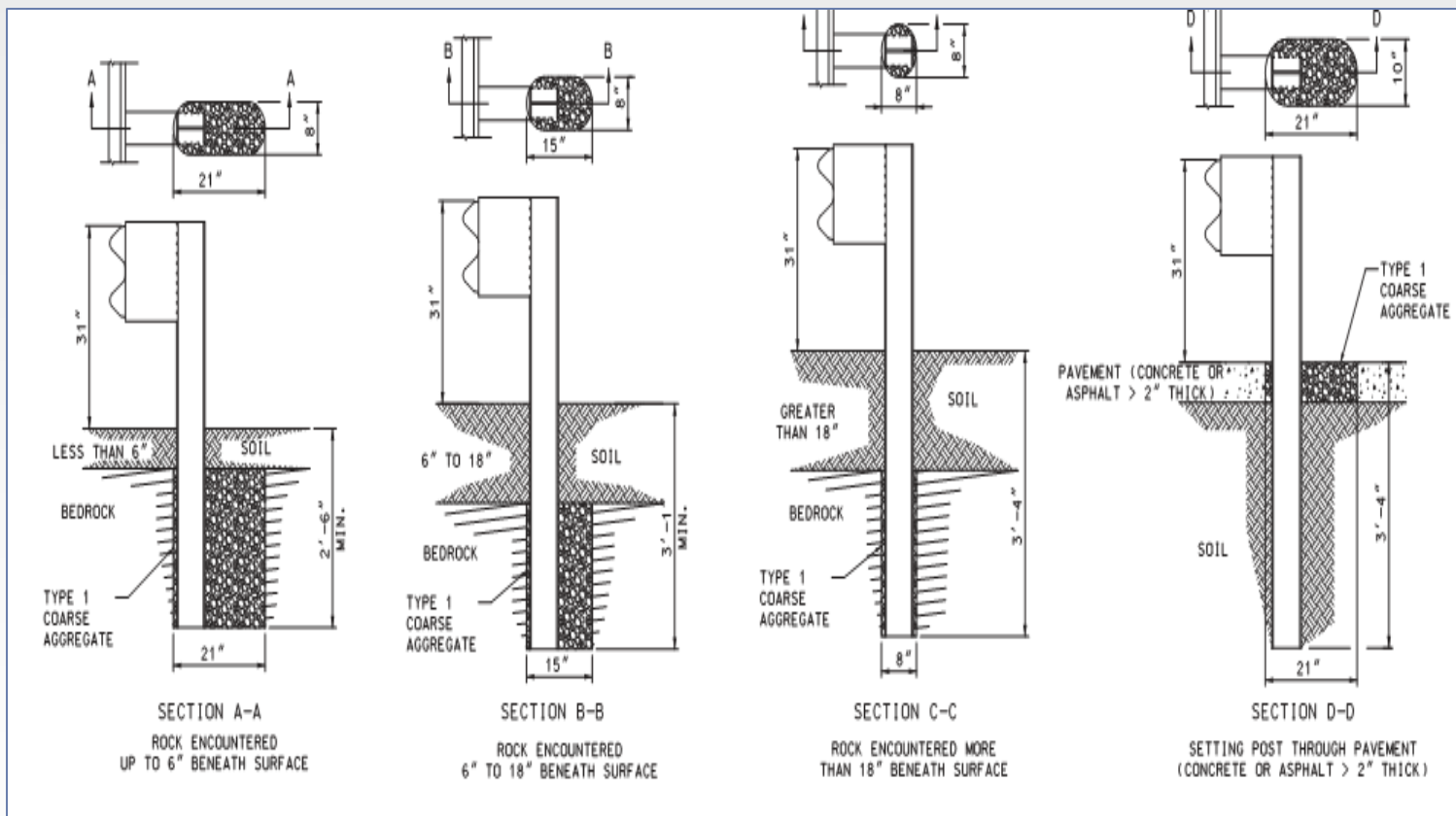
Answer 5.

The Std. drawings 606.00 and 606.50 have scenarios for installation in differing materials, but rip rap is not included in those drawings. In cases where rip rap is used it is best to work with rip rap installers to start placing posts prior to rip rap; just getting them started not completely driven in.

▪



Standard Drawing 606.00 and 606.50



Question 6.

Tightening of Cables - Cables are constructed loose initially. Inspectors need more knowledge on cable construction so that issues can be discussed as the construction is taking place verses receiving a list of concerns weeks after work has been completed.



Answer 6.



Cables on GR are to be tightened at installation to manufacturers specifications AND rechecked and adjusted if necessary before final acceptance. New cables will stretch. Installers are responsible to stretch the cables and retighten them as necessary before turning the run in for final acceptance.

On JOC repair projects, cables on both ends of a run of GR are to be checked and adjusted as necessary before the work is completed and submitted for payment and acceptance for maintenance.

Currently, there are no plans to provide specific guard cable trainings to inspectors. This is something we can look into.





Question 7.

Bullnose & Type B continue to be included in new MGS projects, but neither of these products are MASH approved. What is the plan to address this?





Answer 7.

- A MASH Bullnose is nearing completion at the Midwest Road Safety Facility (MwRSF). It has passed all 7 tests for MASH TL-3 and the final reports are being developed. It will take thru mid-summer 2019 to get all reports posted.
- Type B End Terminals: We are still waiting for MASH products to become available, submittal for APL considerations, and approved/rejected. Some Districts are opting for the double run of MGS with MASH end treatments where the median is greater than 60' (Std. Plan 606.51 sheet 2 of 2).





Question 7a.

If doing away with the Type B's and doing the Twin MGS runs with End Anchors and Crashworthys is there a formula for the length of need?





Answer 7a.

We will still have Type B end terminals and rail runs. Look to the Roadside Design Guide for Length of Need.

Districts have been calculating their length of need based on the terminal anchor on the opposite roadway side as the beginning of their obstacle to protect. It turns out to be a fairly long run, but it is an option.





Question 7b.

Most of the jobs that we are switching out are wanting the guardrail runs up at the edge of the roadway, but have had instances in which they want them back down in the ditch. What is the reasoning for this?





Answer 7b.

Parallel runs of MGS used in median pier protection layouts can run MGS on the shoulder line, adjacent to the Pier obstacle at the minimum offset or anywhere in between the two limits.

The main reason for not installing MGS at the shoulder line would be to reduce the frequency of hits and necessary repairs. Moving the MGS off the shoulder toward the median does increase the needed grading and drainage work and could decrease the necessary length of rail.





Question 8.

Curbs and Gutters - Please clarify the stance on curb and gutter. Last year was discussed the crashworthy's are not be put in where there is curb and gutter. Now there are some jobs where curbs 4" or smaller are being constructed under guardrail.



Answer 8.



Any curb height in the end terminal and approach spaces does affect vehicle/device interaction and device performance. End terminals are not designed or tested with any curb height within the approach or end terminal limits. To be as consistent as possible with the testing conditions, there is to be no curb height in the approach area or end terminal spaces.

- For new construction there should be no curbs constructed in within the end terminals and approach grading spaces.
- On retrofit jobs where existing curb lines cannot be removed entirely, modification of the curb to the least height possible is considered allowable. (limited to 4" or less)
- Additional information regarding curb height can be found at MwRSF (<https://mwrsf-qa.unl.edu/view.php?id=1181>).



Question 9.

We have run into projects in which we are putting crashworthy's in curb and gutter sections and have been requested to still do the shaping slopes class III in these areas. Is that the intention?





Answer 9.

Yes. Grading around GR systems is very important. Proper alignment of vehicles with the end terminal is necessary to get the best interaction and performance





Question 10.

Shaping Slopes Class III --There is still quite a bit of confusion on the grading. The specs for grading have a preferred method and an alternate method. Most contractors use the alternate method. We get some people that say we have to use the preferred method, but why is there an alternate. We will continue to use the alternate as long as it is in the standard plans.





Answer 10.

We will work with Design to see if a note can be add to plans in instances where preferred grading is required. An example would look like...

“Preferred grading required. See Std. 606.31”.

There would also be a column showing the length of Shaping Slopes Class III. If the note is not shown, the contractor would know they have the option to use the “alternate” grading limits.





Question 11.

Partial Acceptance - When guardrail is installed and partial acceptance has been made, there are a lot of questions about who is responsible for payment of repairs when guardrail is hit.





Answer 11.

Once a run of GR has been accepted for maintenance by the DOT repairs to rail damaged by traffic incidents would normally be done by the MoDOT JOC process.

- Approval must be by the RE in some form of writing such as an email or memo.

Damage to the system before MoDOT has accepted a run of rail for maintenance would remain the responsibility of the contractor(s) on the project and would be repaired by the installer on the project. If it is known who damaged the guardrail, the contractor can seek reimbursement from that person's insurance.





Question 12.

Measurement of Quantities - There have been multiple incidents across the state in which guardrail has been measured incorrectly or with the wrong spec. Contractors are willing to assist the inspectors in showing them how there are portions of the runs that are per each and other parts that are LF.



Answer 12.

Specifications and JSPs discuss measurement of quantities in detail. REs are responsible for the verification of measurements.





Question 13.

Discussion about updating the MoDOT Standard Plans and notes on Section 901 and 902 sheets.





Answer 13.

In April 2018 the standard plans (and specifications) for 901 and 902 were updated to reflect moving from high pressure sodium luminaires to LEDs





Question 14.

We have seen 8' post used thru an entire job when the area behind the rail is flat adjacent to a rock cut. What is the policy on the use of 8' posts?





Answer 14.

The standard drawing 606.50 has recently been revised to clarify restrictions on the use of 8' long posts. 8' long posts are only able to be used within MGS runs of rail when the preferred grading template cannot be achieved. 8' long posts cannot be substituted for posts within end terminals.





Question 15.

What is the expectation on the final guardrail height when tying into existing runs? The spec is $\pm 1"$ but there are situations with large height transitions.





Answer 15.

The standard drawing 606.50D Sheet 8 shows the height and block transitions. This is the transition between existing Type A rail systems and MGS rail systems.





Question 16

The new style delineators are very costly.
How are these performing?

Answer 16

So far the reflectivity is good and crash performance is good, but this is still pretty new. How do contractors feel?



Question 17.



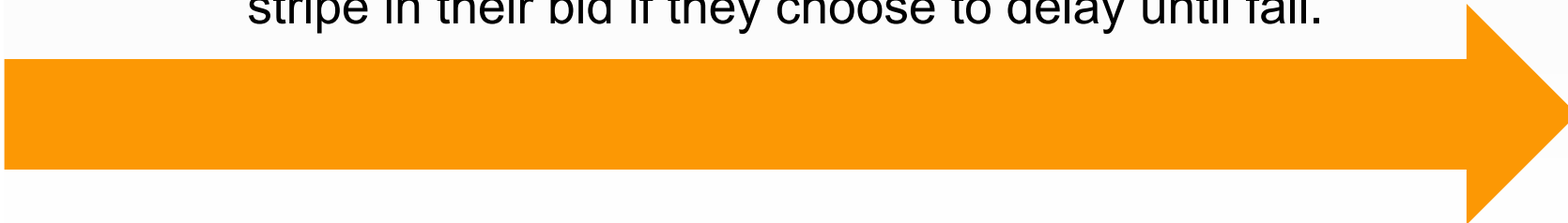
With the Nov 1 completion date for most resurfacing projects we continue to see pavement marking in cold weather, and this year reflectivity was read after snow plowing. Contractors struggle to find acceptable days and pavement marking is wanted by everyone at the same time. After the routes have been hit with snowplows we really don't have much recourse reflectivity readings don't pass. And as for the cold weather paint, there is a prequalified list of manufacturers but the time period of approval is from 10/1/12 to 04/01/14.



Answer 17.



- We use November 1 completion dates for most overlay work in order to avoid this issue. When a contractor fails to meet that date, the pavement marking must still meet retroreflectivity requirements, regardless if the snow plows have been deployed. There are exceptions, but in general, all retroreflectivity deducts and re-work for pavement should be enforced.
- If pavement marking cannot be applied due to temperature, the contractor is responsible for applying “cold weather” paint at their expense. Then permanent paint needs to be applied in the spring.
- There is a new Temporary Stripe JSP that will be piloted on several projects next construction season. This will give contractors the opportunity to include the cost of a temporary stripe in their bid if they choose to delay until fall.





Question 18.

What is the expectation/ direction concerning the clean-up of blast residue, specifically, if the paint removed is not hazardous material. For Example: There are instances we are being required by MoDOT - Environmental to clean up black beauty residue, etc. Are there spec changes coming that will better outline the expectations?



Answer 18.



MoDOT's Environmental section is making some changes to the specs to reflect the direction for cleanup for ALL blast media, regardless of whether it contains paint with heavy metals or not. In DNR's eyes, it is a violation if the material is left on the ground regardless of whether or not it contains heavy metals. They interpret the release as illegal solid waste disposal (if paint isn't hazardous) and illegal disposal of hazardous waste (if material has high levels of heavy metal).





Question 19.

When will a decision be made on the specifications for select granular backfill as it pertains to resistivity. This is a continuing problem every year. Can we allow for lower resistivity numbers if the wall system uses materials other than galvanized straps for MSE walls similar to how IDOT does it? This has been allowed by change order on projects in STL.





Answer 19.

NCHRP Project 21-11 is underway. This is a study for characterizing corrosiveness of earthen materials. Work is currently being done on Phase III which is the trial and construction phase. The study is scheduled to be completed in spring of 2019.





Question 20.

Differing Site Conditions – Can this specification be further discussed concerning the actual site conditions verses the plans and specifically what the spec allows.





Answer 20.

Definition “Subsurface or latent physical conditions at the site differing materially from those indicated in the contract, or unknown physical conditions of an unusual nature differing materially from those ordinarily encountered and generally recognized as inherent in the work.”

Litmus test (what would a reasonable person expect to encounter). It is what you could have anticipated instead of what you hoped to encounter.





Question 21.

Can the Contractor Performance Rating System be improved to better identify contractor's performance?



Answer 21.



MoDOT has started revising the questions/evaluation criteria in order to better evaluate the contractor's performance towards the contract expectations of today. For Example, several questions are being proposed concerning the safety expectations with a project like PPE compliance, work zone management, worker accidents/incidents, etc. The revisions are also working towards reducing the evaluation criteria of over #100 to around #60-#70 elements. The State Statue 7 CSR 10-10 outlines this provision. The plan is to share proposed new questions with industry in early 2019 and "pilot" this new criteria over the 2019 calendar year.





Question 22.

Discuss updating and rearranging the MoDOT approved products list (APL) for traffic.





Answer 22.

At this time we are not aware of any plans for rearranging the MoDOT approved products list. If there are suggestions for improvements, those can be relayed to the Traffic division for consideration.



QUESTIONS

