

# **VDOT Paving Manual: A Pocket Guide**

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### ***BEST PRACTICES***

Discuss the project with your Construction Manager and/or ACE prior to the start of the project so that you are aware of potential issues or special needs and their solutions.

Once on the project, call the contact identified in the decision making matrix agreed upon during the preconstruction meeting if an issue or resolution is not clear or you need further direction.

Matching paving schedules with line marking schedules, it is best practice to review schedules during the off-season.

Inspector needs to visit paving location prior to the work being performed to inspect tie in locations. Paving limits may need to be adjusted to provide a proper tie in location. This should be determined prior to the contractor mobilizing to the site in case budget concerns need to be discussed with the CM.

For mainline paving, you need to look at the condition of the shoulders and what might be needed.

At the end of the season, hold a feedback meeting about what was found and what should be looked at for the next year.

## **ACCIDENT IN YOUR WORKZONE**

### **Situation:**

You are paving on a 4 lane roadway when a wide load comes through the work zone. The wide load is pulling a mobile home. When going past the paver the mobile home hits the side of the paver and rips off the door of the home. The driver of the wide load does not stop and leaves the scene of the accident. No one was hurt.

### **Problem:**

The collision left debris in the road that must be cleared as it is blocking traffic, you need to assess the damage to the paver and you must call for assistance from the police as it was hit and run.

### **Solution:**

Work with the contractor to handle this situation. Try and get as much information on the truck and mobile home as you can. Then dial 911 and explain your problem in detail. DO NOT try to chase the truck down. You are not the police. Only if there is another available inspector on the project that you can send to try and get some more information of the truck would anyone follow the truck. The police will find a wide load pretty easy especially one that has been damaged. Work with the contractor to safely and quickly remove any debris that might be blocking traffic. Take out your cell phone and start taking pictures as well. If the wide load hit the paver then chances are it also might have hit other traffic control devices (cones, barrels, etc.) as well. Be sure to have the contractor send someone immediately to go through the lane closure to make any corrections needed to ensure safety to the traveling public. Once traffic is moving again then help the contractor assess the paver to ensure that it is still fully functional and can continue on with the task of paving. If problems are found and the paver is damaged, you will need to get the contractor to take the remaining asphalt in the paver

and scratch a thin lift over any exposed tack ahead of the paver. Once traffic is running and the paver is either back to work or moved off the roadway you will need to call your District Safety Officer and report this to them and you will need to document the accident in your diary and write it up and send it to the Safety Officer copying all necessary people.

**Situation:**

You are paving on a 2 lane roadway using Flaggers to control traffic. Someone rear ends the last car in the line of cars stopped for the Flagger.

**Problem:**

The accident has left 2 disabled cars in the roadway and there are some injuries from the crash.

**Solution:**

Your first decision should be to move the flagger to a point behind the accident to get the vehicles inside of your work area. This will help protect the traveling public approaching the accident and your work. Call 911. The flagger will be controlling traffic as normal. This will allow police and emergency crews to be able to work safely inside of your work area to provide care if needed. You should also try and help those that are injured within your first aid abilities. Call the district Safety Officer and report the accident. You will need to gather all information you can about the work zone and the parties involved. Go back and ride through the work zone and check all the signs make documentation as to your findings. The Police Officer or Trooper will want to talk with you about the accident and work zone. This would be a good opportunity to perform a work zone safety checklist as well. Document the accident and report it. Obtain a copy of any police reports to make part of your documentation.

## **ALLIGATOR CRACKING**

### **Situation:**

Night paving on a high traffic volume primary 4 lane road in urban Northern Virginia

### **Problem:**

Inspector and contractor noticed that during milling that the outer 6' to 7' of pavement approximately 1800 feet long on the outer WB lane has severe "alligator" cracking and has significant rutting in some locations. This outer lane was completely resurfaced last year as part of a permit project to install a new waterline. The trench for the new waterline was installed in the left side of the outer lane and was reportedly backfilled with 21A. The area of the new trench is in good condition. The area beneath the old waterline (outside of WB right lane) which was abandoned in place is where the pavement has failed. This area only has about 6" of asphalt cover over bank run sand and gravel. What do we do?

### **Solution:**

Mill the outermost 6' to 7' of existing pavement and replace with 2 lifts of BM-25.0A before placing the final 2" of SM. Mill the entire lane to a depth of 2 inches and then perform the deeper milling on the outside of the lane. Then evaluate the condition of the fill material. An ideal solution may be to fill the excavation with two lifts of BM with no vibration on the first lift because the bank run gravel is wet. However you may consider filling the excavation with one lift of BM if the sub grade is too soft. Then overlay the entire lane with SM.

### **Lesson Learned:**

This actually came up in the middle of the night, through consultations with experts the solution was agreed on in the morning and it was fixed the next night.

## **ASPHALT ISSUES**

### **Situation:**

Contract paving on a secondary road without any milling

### **Problem:**

The hot asphalt mat surface was splitting at random locations across the mat and no pattern could be determined as to why this was happening.

### **Solution:**

The Construction Manager called a colleague at an asphalt paving company who had considerable knowledge of asphalt problems. The issue was in the sand that was used in the mix. Manmade sand vs. natural sand had different characteristics in the way it reacted during placement and compaction. He suggested staying back off the mat and allowing it to cool a bit before rolling. This was done and the splitting stopped, density was achieved and there were no more problems. This was contrary to what everyone had been instructed to do with Superpave placement and having the breakdown roller right behind the paver.

### **Lesson Learned:**

Build a relationship with the contractors you work with where there is mutual respect between the two of you. They are the experts and will give us a good job.

**Situation:**

Paving primary or secondary road while working under a temporary lane closure. Several loads have been placed already.

**Problem:**

Road has been prepped (either milled and tacked or just tacked) Contractors' mix appears to be bad (cold, segregated or lack of liquid asphalt).

**Solution:**

Possible options: The contractor shall cover (Scratch) the tacked area with the unacceptable asphalt and discontinue operations until they (the contractor) can fix their mix problem, where bad asphalt is placed it will be milled and acceptable material placed.

## **BRIDGES**

### **Situation:**

Bridges with existing asphalt overlay

### **Problem:**

Contractor arrives on a route to pave which has a bridge structure with an existing asphalt overlay that does not have milling setup for it. Is the structure okay to just overlay per the contract depth, or will the overlay cause the bridge deck to exceed maximum weight limits?

### **Solution:**

The best plan is to have the proposed routes reviewed by an inspector prior to advertisement and have a general note added advising of any additional work. Contact the District Bridge Section for direction if available. If unable to speak with the Bridge Section then the safest route is to mill the planned depth and bring it back to grade, being extra cautious not to mill into the bridge deck or catch any steel joints.

**Situation:**

Approach slabs

**Problem:**

Cracked or broken bridge approach slabs.

**Solution:**

This should have been addressed prior to project. There are possible solutions (ie. Sawcut, remove bad section and repair with concrete or asphalt plant mix) however, these are generally outside the scope of a paving project. Therefore, the best immediate solution would probably be to cover the milled area with asphalt and continue the paving operation. Then, notify District Bridge, Maintenance of the issue so that a permanent fix can be considered.

## **CONNECTIONS AND TIE-INS**

### **Situation:**

Secondary Connections

### **Problem:**

A route has numerous secondary connections and one is found to be in very poor condition with a joint back 100' or so from the intersection, well past the typical 50' limit. Do you pave to the joint?

### **Solution:**

Consider the entire section prior to making a decision about a particular spot as it is most desirable to limit the number of joints in your asphalt. In almost all cases we should pave; however, an assessment of other connections is in order to ascertain tonnage needs to complete the section. Are there other connections that need little or no paving?

**Situation:**

Urban areas

**Problem:**

Knowing where to stop in urban areas to ensure the best product

**Solution:**

Get the superintendent to mark the roads for the projects—pay attention to joints even if they go further than the contract states.

**Situation:**

Entrances

**Problem:**

While paving a secondary route an entrance is encountered on the outside of an elevated curve, it is paved and obviously sees lots of use or you have varying heights throughout the project. How do we construct the tie-in?

**Solution:**

We should construct these tie-ins so that the grade is as good as the existing prior to paving. This may eliminate an issue of maintenance forces having to address after the fact. When you have varying heights throughout the project, be sure to ensure that the end result will not cause vehicles to bottom out. Additional hand work may be required in some locations. Take before and after photos for documentation.

**Situation:**

Bridge Tie-in

**Problem:**

Bridge Tie-In Milling

**Solution:**

The contractor should string line this area and measure to ensure the proper length and depth for a smooth transition to alleviate any opportunity for bumps in the asphalt surface. In some cases due to the existing lay of the existing pavement, some tie-ins may need to be longer or shorter than the Contract Drawing specifications in order to create an optimum riding surface.

**Situation:**

In building an underpass, we installed a temporary detour road 6 lanes wide parallel to the new proposed underpass which tied into the existing road on the North and South ends of the underpass. The detour road was to be removed in its entirety at the end of the project.

**Problem:**

The plans didn't account for concrete pavement under the entire existing asphalt roadway.

**Solution:**

At the time of building the detour road, and to help minimize rigid pavement demolition, we adjusted the proposed detour tie in points to incorporate the concrete pavement. We then installed the permanent asphalt pavement structure to the top of the intermediate course to provide the permanent north and south approaches to the proposed underpass. Lesson Learned: Foresight and investigation prior to project —saved money doing this one.

**Situation:**

Paving under structures

**Problem:**

Clearance

**Solution:**

When going under bridges do not want to reduce clearance – you need to verify and document vertical clearances before and after paving. Clearance measurements can be taken by several methods, (ie. Inverted level rod steel or cloth roll-up tape). It is always a good idea to document your measurements.

## **CONTRACTS**

### **Situation:**

Overruns are happening but the work is being performed within the guidelines and dimensions set forth in the contract.

### **Problem:**

The asphalt yield should be checked periodically throughout the day to ensure that the proper tonnage is being laid and at the proper depths. Prior to starting work it would be good to talk with materials and the asphalt plant to determine what the specific gravity of the mix is that is being laid that day. Oftentimes the contract is set up on a set specific gravity for the mix. This can change from plant to plant due to the source from where the material is coming. Knowing the current specific gravity will help you keep track of the tonnage laid and can prevent overruns on your contract.

### **Solution:**

If time allows, compare your contract quantities to your actual quantities. Discuss this with the Construction Manager to review potential impacts to the contract. A route may be deleted or shortened due to the difference if funds do not allow. If you are on the last or only route on the schedule then be sure you pay close attention to this because if there is milling on the project then you will need to stop the milling operations before they get too far ahead of the paving and cause the overruns. The paving may also have to be cut short on the route to prevent the overrun. You will want to know this when paving the first lane. You want to finish with square joints.

**Situation:**

Limitations of Operations require the Contractor to be out of the road at 5:00 AM with significant disincentives if they go past that hour.

**Problem:**

Contractor is paving on an Interstate highway at night about 4:30 AM and the last load has arrived. The placed load is one half-load short of the joint to finish this lane. We must be out of the road by 5:00 AM. Do we wait for the last half load to finish paving this lane or pick up and be out of the road by 5? OR It's 4:35 AM, the Contractor has 2-trucks 15-minutes out with 50-ft of road left to pave and the weather forecast for the next three days is rain, what does the inspector do?

**Solution:**

Contractor has the option of placing the last half load or coming back the next night. If they choose to place the last half load, notify the TOC of the situation that you will be late picking up the lane closure, and notify CM/ACE of the situation. Notify contractors that they will be responsible for disincentives. Note that safety is a top concern in making the decision.

**Situation:**

Asphalt resurfacing contracts

**Problem:**

Asphalt resurfacing takes place over long sections of existing highway. Often, measurements are imprecise which may lead to inconsistent quantities. Additionally, conditions may change during the paving and milling process. Changes in conditions and quantities may require a change in pay quantities.

**Solution:**

Even though the job superintendent represents the contractor and you, as inspector, represent VDOT, the two of you should develop a working relationship that delivers an acceptable project. This often requires the inspector, in partnership with the contractor, to make decisions to modify the contract. These decisions are almost always needed within minutes or under an hour because they likely impact equipment, crew changes, on-site production, product storage at the plant, and plant production as well as the maintenance of traffic. The project always runs more smoothly when you and the contractor's superintendent review a paving section prior to starting daily work so that you can anticipate as many potential problem areas as possible.

## **ENVIRONMENTAL INCIDENT**

### **Situation:**

There is a rupture to the tank of an Asphalt Distributor causing a spill of a few hundred gallons of liquid asphalt.

### **Problem:**

The asphalt material has the potential to enter nearby streams and or cause a traffic hazard.

### **Solution:**

Immediately reposition the distributor away from any streams or waterways and away from the roadway if possible. If not possible, utilize all means available to contain the material, i.e. spill kits, local dirt and gravel, equipment and manpower. Inform the CM/ACE and the District Environmental/Haz-mat coordinator. Prevent contamination of water and minimize any hazard to the public to the fullest extent possible.

## **EXISTING PAVEMENT**

### **Situation:**

Surface Prep Prior to Paving,

### **Problem:**

It is important that the inspector observe any milling or paving operation. Corrections to the base must be completed prior to attempting to begin the paving operation. Milling or planing is performed in order to remove existing asphalt paving to match the grade of existing surfaces such as the paved shoulder, existing gutter pan or to maintain the relationship to the existing guard rail. It is important that the asphalt surface remaining after the milling operation be reasonably smooth and on a consistent plane

### **Solution:**

Should loose aggregate remain, the surface should be re-swept. If “scabbing” or loose chunks of asphalt remain, remove the defective areas and:

1. If possible, lower the milling head in order to remove the defective area
2. Consider increasing the depth of surface mix being placed up to the maximum
3. You may consider applying a “scratch” coat to level the area
4. Switch to a base mix and surface over it
5. Switch to an IM and come back and resurface the following year

**Situation:**

Difference between existing asphalt and initial base layer

**Problem:**

Contract indicates a planned width to mill and replace existing asphalt. Upon milling it is noted the existing asphalt is wider than the initial base layer of the roadway due to a previous overlay or widening from maintenance work. Do you lay asphalt out to the planned width which is wider than the roadway base or bring the width back in to the original roadway base width?

**Solution:**

If the quantity allows for the actual width existing in the field then proceed to lay the asphalt to the planned width. If the width in the field is wider than what was allowed for in the contract, bring the width back in to the original width of the road base.

**Situation:**

Paving Milled Roadway, improperly cleaned

**Problem:**

The milled surface is not cleaned properly but cold weather or rain is imminent, Contractor says they have to pave or they will miss their window to pave because they won't have roadway temperatures for a long time that meet our specs.

**Solution:**

DO NOT TACK, DO NOT PAVE. We can allow temperature variances that will allow pavement to be placed almost immediately once the proper people are notified. We do not pave on unclean surfaces or we will come back in a year or sooner and have to repave again. The contractor is responsible for temporary striping according to specifications.

**Situation:**

Compaction

**Problem:**

Insufficient base on secondary road to get compaction

**Solution:**

Give forbearance (a one-time waiver) on compaction or, place base followed by surface mix.

This solution will be additional cost. ***Refer to Spec 315.05(e)1, or work with materials to verify lack of compaction variability.***

**Situation:**

Milling

**Problem:**

Milled 2" and encountered stone.

**Solution:**

Inspector immediately notified the CM and TYPE II Restoration was done. This method is expensive but it was better to fix the problem at hand in order to avoid the new pavement failing shortly after completing the project. Another potential Solution:

Notify materials section to generate new paving structure.

## ***GORES OR WEDGES***

### **Situation:**

Unforeseen gore or wedge area when only SMA is on the contract.

### **Problem:**

Gores or wedge areas require significant work by hand and the strict structure requirements of SMA make it difficult to work by hand and still get an acceptable mat.

### **Solution:**

Allowing the contractor to hand place another surface mix such as SM 12.5 in a wedge area is an appropriate solution. This will allow the contractor to be able to hand work the mix to provide positive drainage. Note to make sure that the contract has a SM 12.5 mix or that an agreement for payment is worked out before the work is done (look for beforehand).

## **HYDRAULIC**

### **Situation:**

Hydraulic Fluid Leak

### **Problem:**

Hydraulic Line Break on New Overlay or if breaks on old pavement

### **Solution:**

First, the inspector should advise contractor to repair leak before continuing to pave. Second, the inspector should mark the area where the leak occurred from start to finish and record the coordinates of the stop and start point. This will help in the future to perform corrective measures to repair the affected area by the leak. The inspector shall document this issue in the daily work report, including the coordinates of area needing corrective measures.

## **JOINTS**

### **Situation:**

Vertical Joints

### **Problem:**

Vertical joint is not free of soil and loose debris, tacked correctly or straight.

### **Solution:**

Vertical joints should be tacked with complete coverage so that slight puddling occurs at the bottom of the joint face. *Get a photo of reasonably straight joint.*

**Situation:**

The contractor has started paving, and you are behind the paver observing the mat coming out. You can see that the edge of the mat is zig zagging, rather than straight and parallel on each side. This will lead to a zig zagging joint.

**Problem:**

This creates a problem for the centerline joint if you have to install snow plowable markers, which need to be 6" from a joint - you may not be able to install them at the required spacing. It also looks very bad regardless.

**Solution:**

If you observe that the mat is not straight and parallel you should stop the paving operation and:

- If you are placing more than 100 tons at this location, the contractor is required to have an Asphalt Technician on site who is responsible for inspecting and straight-edging the surface and edges of each layer, and performing necessary corrections prior to compaction (R&B Sec. 315.05 (c)). You should tell the superintendent that the technician should be correcting the edge of the mat prior to compaction so that the joint will be straight.
- If you are placing less than 100 tons at this location you should let the superintendent know that this is not acceptable, and you are going to recommend that they remove and replace this section. If they make a change and try to resolve this and then start off again, and still cannot produce a straight mat, you should request that they stop until they can get the proper equipment/personnel to resolve this. They will most likely want to pave whatever area was milled, and then stop. You should let them know that all of the paving they placed with zig zagging

joints is not acceptable, and that you are recommending that they remove and repave it at their cost.

Make sure you take pictures of the joints and document your conversations with the contractor.

## **PAVEMENT MARKING**

### **Situation:**

Contractor on site ready to install markings but does not have Form C-85 available or the ability to print one out due to malfunctioning equipment or lack of internet access in rural areas.

### **Problem:**

There is a route that has no marking on it. Being unmarked causes a safety issue to the traveling public. These lines need to be installed ASAP no matter if they are within the proper time frames or not.

### **Solution:**

It is a good rule of thumb to keep some blank copies of the Form C-85 in your truck when doing this work. Then if there is a malfunction with equipment one can be manually filled out. Another good idea is to allow the contractor to do the marking before you ask if they can provide the C-85 form. Once lines are installed you have removed the safety issue to the traveling public and you have the blank copies in your truck that you can provide to the contractor to fill out. Line Marking Contractors are in great demand and if you do not take full advantage of them while they are on your project it could be weeks before they return. So do not send them away without installing the lines or markings just for not having the correct paper work.

**Situation:**

Paving contractor has completed paving of a route and you have not got any definite answer as to when to marking contractor will be onsite to perform permanent or temporary markings.

**Problem:**

Prime contractor has provided a schedule to you that show the marking contractor following closely behind the paving that satisfies the time frame requirements in the contract and specifications. However the route is long overdue for markings to be installed.

**Solution:**

Here is where project communications between you and the contractor come into play. Keep close watch on the hours since markings were obliterated. Keep reminding the Prime contractor of the time frames and the importance of getting marking installed. Also if necessary get in touch with the marking contractor to ask when their anticipated time of arrival will be. Also keep your Construction Manager informed as to the situation so if measures need to be taken such as halting additional paving operations until the marking contractor can catch up are required. This may very well be the only way to keep within the time frames laid out in the contract and specifications.

**Situation:**

The contractor is installing line markings on your new pavement at night. They are fast approaching the time frame in the contract to stop work due to traffic volumes. The operation is approaching a signalized intersection but will not complete the markings before they have to stop to stay in compliance with the time frames in the contract.

**Problem:**

There is a signalized intersection that has no markings to delineate the lanes or the stopping area. You have work start and stop time frames in the contract where you are going to stop them and have them get out of the roadway. Roadways that are supposed to have markings and do not, is a hazard to the traveling public.

**Solution:**

Given the situation I would allow the contractor to go over the work time limit in the contract and I would have them insure that the long line markings are in place especially the lane division lines at the intersection. Edge lines and other markings can wait till the next work day to start. The lane division lines are very important and the contractor should be able to install these fairly quickly. If the work is going to take the contractor a long time to complete and the disruption to the morning traffic will be lengthy. Then the best thing to do might be to just pick up where the contractor is and go paint the centerline at a minimum. A good rule of thumb is to look at your work before you begin it. It might have been a good decision to first get the lane lines through the intersection. Then go back and start the others. We typically do not like to stop and start lines like this but it might be the solution to the original problem of the intersection not getting marked in time for morning traffic.

## **SAFETY**

### **Situation:**

Sign layouts

### **Problem:**

Improper sign layout and maintenance of

### **Solution:**

Contractor should have sketch of proposed construction sign layout for each route using the Virginia Work Area Protection Manual, for all lane closures, and traffic control through the work zone. The sign layout must be approved by VDOT. Once approved, these sign layouts shall be used and the contractor shall adhere to the guidance set forth in the Virginia Work Area Protection Manual, for placement, maintenance, and spacing of Construction Signs. Resource is traffic control folks at VDOT

**Situation:**

Milling and paving the left lane on I-95 in Fairfax County at night and the contract states that we must maintain two lanes of traffic at all times.

**Problem:**

Inspector notices that traffic in the center lane is too close to the workers, a vehicle hit the lute one worker was using knocking it from his hands, what do we do?

**Solution:**

Close the center lane and maintain only one lane of traffic. Call TOC and inform them. Have the contractor place another message board several exits before the work zone to alert motorists to use an alternate route(s). Inform CM/ACE.

**Situation:**

Traffic control monitoring and review

**Problem:**

Always monitor and review traffic control as the project progresses. What should you do if you encounter abrupt braking or other abrupt behavior by motorists?

**Solution:**

Look for sufficient visibility on the approach to the lane closure. It may be necessary to adjust the beginning or the end of the lane closures in order to improve visibility for the motorist(s).

1. Observe the flag person. Confirm:
  - a. Are they wearing the proper high visibility clothing?
  - b. Is their high visibility clothing clean and still highly visible?
  - c. Are their directions to the motorist(s) appropriate?
2. When using flag vehicles to lead traffic through a lane closure:
  - a. Continually review the traffic queue. It may be necessary to reduce the length of the lane closure in order to shorten the queue.

## **SCABBING**

### **Situation:**

Scabbing

### **Problem:**

When 0" to 2" milling is set up in the contract, during milling, scabbing is apparent

### **Solution:**

Start your milling depth @ 1.5" for approximately 50' to 100' and check to see if scabbing is present. If scabbing exists, back the milling machine up, adjust the depth to 1.75" and try again. Mill for approximately 50' to 100' again, and then check for scabbing. If scabbing is still present, adjust to the full 2" depth. Keep in mind that if you are overlaying under a bridge structure, you will need to verify that you **do not** raise the grade at all due to the bridge clearance needing to stay the same. Always check overhead clearance before and after paving under a bridge. Record this verification in the daily diary.

**Situation:**

Scabbing remains after planing or milling.

**Problem:**

This potentially impacts durability, bonding, and ride ability.

**Solution:**

Lower the milling head. Inconsistent old surface mix may require the milling head be adjusted, several times during a milling/planing operation. Be careful and try not to “chase” the proper milling plane. Try to minimize the deviation, if you find you much raise or lower the milling plane, try to make a transition from one plane to the next. Abrupt changes will likely reflect through the Asphalt mat and affect rideability.

If increased milling depth has an impact on strength. Because of reduced structure there are several options:

- Increase the depth of surface mix being placed up to the maximum.
- Switch to a base mix and surface over it.
- Switch to an IM and come back and resurface the following year.

*Minor amount of scabbing is acceptable if adhered to existing pavement—need photo*

## **SHOULDERS**

### **Situation:**

When a contact calls for mill and fill areas of the mainline paving, at what point is the shoulder too narrow to leave in place.

### **Problem:**

When performing mill and fill operations on mainline paving, the shoulders are not normally milled and replaced thus leaving a longitudinal joint at the shoulder break. The area is milled and then it is paved. Often times rolling can cause the shoulder to push away and break-up if the shoulder left in place is not wide enough. Shoulder widths can vary a great deal in one paving section when overlaying existing routes. If the rolling does not cause the failure then it does not take long before traffic running over on the shoulder or big trucks tracking on the shoulder causes the failure to occur.

### **Solution:**

First review and look for this during preliminary reviews of the route. If areas of concern are found then discuss it with the Construction Manager because it could lead to overruns of asphalt and milling quantities. A good rule of thumb is that if the shoulder is less than 2 feet in width then it should probably be removed and repaved with the mainline. This will prevent future failures of the paved shoulder.

**Situation:**

Shoulder stone overruns

**Problem:**

When repaving an existing route oftentimes the quality of shoulder maintenance on the route will affect the shoulder stone quantity. Rutted and badly worn shoulders cause overruns.

**Solution:**

Shoulder stone is usually set up in the contract in order to prevent a low shoulder. Other construction operations call for a 10:1 shoulder such as guardrail end treatments. If this same concept is used only 14-16 inches of shoulder stone needs to be replaced. Also look closely at the shoulders. If the shoulders are mowed shoulders then oftentimes less can be placed due to the buildup of the shoulder from years of mowing. Pay close attention to this because you will need to make sure the contractor is aware of where not to install as much stone.

## **STRIPING**

### **Situation:**

Line striping

### **Problem:**

Location of Line Striping

### **Solution:**

The contractor should have sketches drawn prior to start of work to ensure all pavement markings are properly placed back in the area of the pre-existing markings. Previous markings should be mirrored.

## **TACK**

### **Situation:**

Tack

### **Problem:**

Contractor comes to jobsite to pave and advises you he only has regular tack when the requirement is for trackless tack (required May 1-October 1) for that time of year. Do you allow the Contractor to proceed with paving or advise them they cannot work until they have the trackless tack?

### **Solution:**

Do not allow work to proceed until they have the trackless tack.

**Situation:**

Equipment Issues that impact tack

**Problem:**

During the paving operation the paver breaks down, the Superintendent contacts the plant to stop production and load out, however three trucks are on site and two are in route. Tack has been shot. Repairs to the paver take significant time with the result that the mix in the trucks does not meet temperature requirements. Do we use the mix to pave the previously tacked area, to reach a joint, and/or meet a time requirement?

**Solution:**

Consider utilizing the mix by allowing a load to be placed then assess workability and ability to meet compaction. If not workable, consider utilizing the hottest load(s) to scratch over the tack. Reject and get hot mix if time allows.

## **TEMPERATURE**

### **Situation:**

Temperature falls before finishing laying asphalt

### **Problem:**

On a cool night, the contractor is laying asphalt. The temps fall below the 40 degree mark. There is enough asphalt on the road to complete the paving in a lane.

### **Solution:**

Finish paving the lane. Do you stop the paving and create another transverse joint, knowing that adds another weak point in the pavement. Placing the last 4, 5, 6 trucks to finish the lane, but being a little out of the temp spec is less of a problem than a needless additional transverse joint.

**Situation:**

The mix is under minimum temperature when delivered to the project

**Problem:**

If load is incorporated in the paving operation, the asphalt would most likely ravel.

**Solution:**

Lead inspector makes sure the field inspector has copy of mix designs to verify temperatures. Inspector needs to be on site for each and every truck load to check temperatures. Reject load. Remove failed asphalt (No payment will be allowed).

## **TRENCH WIDENING**

### **Situation:**

Trench Widening

### **Problem:**

Past overlays may have moved out past the pavement structure, so it is critical to verify where the existing pavement structure begins.

### **Solution:**

Contractor should begin trench widening procedures and establish edge of existing asphalt through each course of the sub base in order to ensure proper bonding of new material.

## ***TURTLE BACK (EXCESSIVE CROWN)***

### **Situation:**

Paving to Improve the Cross Section

### **Problem:**

Paving turtle back secondary highway

### **Solution:**

You may consider increasing the pavement depth to maximum. However, this may make achieving consistent compaction difficult. Consider applying a leveling course (scratch coat) to achieve an acceptable cross section before surfacing. Be considerate of profile and drainage.

## ***UNEXPECTED ABSENCE of INSPECTOR***

### **Situation:**

Unexpected absence of inspector

### **Problem:**

The job requires multiple inspectors.

### **Solution:**

DO NOT TRY TO PAVE WITH ONE INSPECTOR.

If this was planned, it was a BAD plan.

Meet with ACE and CM and reconsider.

If this was caused by unanticipated absences, call the project inspector on another active project to see if an extra hand may be available. If help is available, take it whether certified or not. Now is not the time to be picky. Email CM as soon as practicable to advise of the staff change.

If help is not available, call the CM or any other available CM and let them know your situation. He may know of someone who can be dispatched.

When all else fails and you are doomed to take these activities on alone, remain calm.

The best you can do is all you can do.

You know the planned depth and width of what you are working on.

Determine a ball park figure for tonnage for a defined distance so you can spot check the delivered tons to the distance paved.

As long as you are close, you can feel pretty good that things are going as planned

You will need to rely on the expertise of the contractor.

Ask yourself which crew you have the most confidence in.

The one you trust the most is the one you watch the least.

Meet with the Superintendent in charge and explain your situation.

Ask him to keep his milling operation as close to his paving operation as possible.

The milling has to begin prior to paving so at first you will only have one operation to check.

While you have only this operation ongoing, make sure you are getting exactly what you want as far as depth, cleanliness, and scaling.

Once this is achieved, let the foreman know that you won't be able to stay with him, but if he doesn't want to back up for re-work later in the night, all of his work is to look like this.

Repeat this process with the tacking.

Last is the paving.

Stay with this operation until it is going to your liking.

Meet with the density technician and tell that person to come get you when it is time to take/weigh plugs. Depending on how the other operations are going, you may not be able to observe this. Don't worry. The best you can do is all you can do. If you did not observe the test, do not sign the form that says "Observed By", you can strike through "Observed" and write "Received". **NEVER FALSIFY A RECORD**

Continue rotating from one operation to another and pray for a breakdown.

## **WATER**

### **Situation:**

Water

### **Problem:**

Water “perking” through base after milling:

### **Solution:**

*“Better fix it before you pave”*

1. Stone drain to side ditch
2. Spring box - drain to side ditch
3. Install drain tile “underdrain” to side ditch
4. Since you will probably no have a pay item for this work. You may have to call the residency or maintenance for help. You may be able to work an agreement with the contractor.
5. Probably should call the CM to let him know what you are thinking.

**Situation:**

Water

**Problem:**

When milling in a “sag vertical curve” or other areas where water can pond in the milled area

**Solution:**

Make sure there is a positive outlet so that rain water may drain out of the travel way and across the shoulder. This may involve cutting a channel across the shoulder that is paved as the final surface is applied.

***ADDITIONAL INFORMATION***

**For Additional information on how to fix common paving issues go to the link below:**

<http://www.pavementinteractive.org/category/pavement-management/pavementdistresses/flexible-pavement-distress/page/3/>

## ***CONSTRUCTION***

### **Situation:**

Drop Inlet location

### **Problem:**

Drop inlets are almost always located at the low point of the roadway grade.

### **Solution:**

It is not unusual to shift the actual location slightly so that the center of the throat of the drop inlet is located at the low point. Notify CM so maintenance can address later.

**Situation:**

An urban project was designed to widen the roadway from 4 to 6 lanes. This included removing old pavement structure and no undercut was included in the contract documents.

**Problem:**

Soil borings showed poor soils/clay to a depth of 10'+. In the first 300' section of widening I had the materials section come out to look at the material.

**Solution:**

The materials Section agreed with my recommendation of a 1' cut of extra regular excavation, geotextile fabric and 1' of additional 21-B to be end dumped and bladed with a track dozier (dump trucks and wheeled equipment could not be used, due to severe rutting and pumping of the grade. We used a small static roller and end dumped the remaining stone, fine graded and performed the roller pattern and densities. I told the Prime Contractor and Asphalt Subcontractor to use an asphalt transfer machine (to stage from the existing roadway) and track paver to apply the asphalt. All widening had to be performed in this fashion. Since we encountered the problem early I had the materials section take borings throughout the corridor and perform an existing pavement study. It was determined to mill 1 ½" to 2" of the original surface and grades allowed us an asphalt buildup of 5" to 6" and meet the pavement structure requirements.

**Lesson Learned:**

In turning the majority of the project into a mill and overlay job we cut a year off of the schedule and saved 4 million dollars (and possibly much more had we had to undercut the entire project).

**Situation:**

Guard rail installation on secondary

**Problem:**

Guard rail may normally be installed on fill sections where the fill slope is 3% or greater. It is not unusual to waste excess material in areas where the fill slopes are greater than 3%. What do you do if you encounter an area where the slope has been reduced in this manner and the resulting slope is flatter than 3%?

**Solution:**

DO NOT install the guard rail solely because it is shown on the plans. It is likely that the guard rail is no longer needed.

**Situation:**

Pipe installation

**Problem:**

Although construction plans may show a precise location for a pipe installation, pipes are almost always installed in an existing drainage channel. The existing channel location almost always takes precedence over the plan location and skew angle. It is common to replace a pipe where one has failed.

**Solution:**

If the replacement pipe is the same diameter and if there is no history of flooding or damage caused by the existing pipe being too small, it should not be necessary to perform a drainage study to confirm the size of the replacement pipe.