

XII. URBAN PAVING

Paving in an urban situation offers unique challenges not always encountered on typical paving projects. Utilities, staging and accesses are much more critical issues to the agency, contractors, property owners, and the traveling public.

Prior to starting an urban paving project, check the information from the right of way contract for each property owner and compare any specific request from the owners to plan information, particularly with regard to entrances. Also become familiar with the locations of intakes, manholes and sidewalks, as they will all require some type of special shaping.

Urban projects will usually have a base consisting of special backfill or modified subbase. This allows the contractor to utilize the base as a haul route for concrete delivery. This haul route in turn creates its own set of problems as the inspector must monitor the condition of the base to avoid rutting. Dowel bar placement is done just prior to the paving operation. Placement of subdrains will usually occur prior to paving, as drains are underneath the slab in most urban situations.

A. Boxouts

On urban paving projects you will become very familiar with boxouts and gaps while placing pavement. Boxouts will generally occur at intake/manhole locations, side street connections and at pavement width change locations. Also temporary access for property owners can result in gaps in pavement.

The contractor will usually form a boxout by staking steel forms in place. Then rock is normally placed in the boxout to prevent the intended gap from filling with concrete as the paver passes by. It is important that the forms be checked for accuracy of placement and checked for stability, as the paving machine will exert a lot of force on forms as it passes by.



Urban street paved half at a time



Box outs in multilane paving



Boxout for utility access

After the paving machine passes by, the contractor should dig concrete and rock out of the boxout to insure that dowel bars and forms are in the proper locations. Later in the project the side road will be placed or a subcontractor will fill in manhole boxouts.

Jointing around boxouts is very important. Irregular shapes often require additional joints in order to prevent cracks from forming. Sometimes the pavement jointing must be modified in order to accommodate the jointing required by the boxout.

B. Curbs

Urban projects will usually always have curb and gutter. When machine paving, the contractor will have a curb-shaped template attached to paving machine pan to form the curb. This typical pavement section requires additional inspection of gutter flowline elevations to prevent problems of water ponding instead of flowing to intakes and manholes. Also, driveway and sidewalk curb cuts will require modification of the normal curb section by hand finishing. Median and stop sign islands will require special shaping of the curb section by hand finishing as well. Close attention should be given to the plan details for location and type of joints to insure that the contract requirements are being met.

C. Hand Pours

Urban paving projects typically have a very large percentage of hand pours versus rural projects. Much of the pavement is placed by hand methods simply because the design, physical constraints, staging, or other factors make the work more conducive to hand placement versus machine placement. Examples of this would be reconstruction of an intersection while maintaining traffic or short placements at driveways or accesses where mainline paving was gapped to maintain access to private property. In other



Crack resulting from poor jointing around utility access boxout



Hand placement of the curb



Flow line lower than intake



Radii are irregular shapes and normally are constructed using hand pours

instances, such as irregular areas, hand placement methods may be the only option. In either case, it is important to remember some of the fundamentals of placing concrete pavement by hand methods.

1. Subgrade/Subbase Prep

The most important thing to remember when talking about subgrade and subbase preparation for concrete pavements is uniformity. It is important that the subgrade soils and subbase materials be uniform materials at a uniform density. The first step in ensuring uniformity should be to check the area for soft spots. Often there is a significant amount of underground work such as storm and sanitary sewer, intakes, and utility relocation that occurs on a project leading up to the paving operations. It is important to check the subgrade to insure that it is stable and firm and that no soft spots remain from prior underground work.

2. Form Placement

Forms for hand placement should be clean and free of debris, dirt, or hardened concrete. They should be straight and true with minimal deviations. Forms should be oiled prior to concrete placement to prevent concrete from adhering to the form which could lead to spalling or chipping when removed.

The forms should be adequately anchored and properly supported to prevent movement during placement. There should not be any clumps or irregularities underneath the forms. A great deal of force will be exerted on the forms during placement and it is important that the forms remain true to line and grade.

Forms should match the thickness of the pavement to be placed. They should be set to the proper line and grade.

Accuracy of form placement can be checked in a similar manner as checking string line for slip form operations; the



Steel forms in place for hand pour

form line can be eyeballed to identify any obvious deviations.

When placed in curved sections, forms should be checked to insure that they have been set to the proper radius. Forms should also be checked to insure that the pavement will be built to the proper cross slope to allow drainage. Mainline paving is typically placed before intersection returns and radius. It is important to check the existing pavement to insure that it was built to the correct elevation. If the pavement was not built to the correct elevation, then adjustments to the grade and or cross slope may be necessary to insure that proper drainage is provided.

3. Objects in or Under Pavement

When the subgrade or subbase will not be used as a haul road for delivery of concrete to the paving operation, fixtures within the pavement should be placed well ahead of the start of paving.

Boxouts for intakes and utility accesses, fixtures that are cast in place, traffic signal handholes and preformed loops, CD baskets (when used), tie bars, and wire fabric should all be in place at the start of paving to minimize disruptions in the progress of the work.

4. Concrete Placement

There are several types of machines that may be used when placing concrete pavement by hand methods. Most often a vibratory type screed or a tube type roller screed will be used. Occasionally a bridge deck finishing machine may be used. Each of these types of screeds does impart some vibration into the slab, but use of supplementary vibration is recommended for most placements and necessary for thicker placements (greater than 9 inches) and reinforced pavements.

Because each of these types of screeds is much smaller than a slip form paver, it is important to place concrete evenly in front of them to allow them to uniformly



Placement of tie bars and CD baskets prior to paving

strike off the concrete and produce a smooth surface. While placing concrete from the chute of the delivery truck does place the concrete close to the desired location, typically additional manipulation is necessary. Vibrators should never be used for this as they can cause segregation when used to move concrete. Only shovels should be used to move concrete to provide a uniform head in front of the screed.

5. Finishing

When finishing pavements placed using hand methods, it is important to remember that all concrete adjacent to forms must be edged using an edging tool. This is important because edging rounds the corner of the slab and provides a break between the forms and the concrete, preventing tearing or spalling of the concrete when the form is removed.

Fixtures in the pavement should also receive special attention during finishing to ensure that they blend in with the surrounding pavement and will not create a bump, dip, or a snag point for snow removal equipment.

D. Obstructions

Due to the confined work areas on urban projects, paving beside, around, and over obstacles often cannot be avoided. These obstructions can be anything from utilities and trees to historic landmarks. The general rule for these situations is to make everyone aware of potential conflicts before construction begins in order to avoid as many problems as possible.

The agency needs to consider the clearance needed to accommodate the paver track and the clearances needed for other equipment. If the back of curb will fall too close to obstructions that can be moved, those arrangements need to be made long before the contractor arrives on the project site.



Pavement edge next to a utility access



Pave around the pole

Delays in the construction can result if utilities, for instance, are not moved in a timely manner. As much lead-time as possible should be given in order to avoid a conflict.

Additional gaps, boxouts and pavement joints may be required for machine clearances.

Also consideration needs to be given to the elevation of adjacent objects, such as fire hydrants. The final elevations should be adjusted to coordinate with the paving elevation.

E. Jointing

Correct jointing is critical for a quality and long lasting pavement. Care should be taken to see that the plans are followed in regards to joint spacing and placement. Most plans will show a standard or typical joint spacing and will have additional details for intersections. It's a good idea to layout intersections and driveways first and then transition back to standard spacing for mainline joints. Despite taking all precautions possible pavement joints can still end up in the wrong location. Whenever possible, adjust the location of planned joints to match existing joints in order to minimize random cracking. Extreme cases can require removal and replacement to correct deficiencies.

F. Access Locations

When the project first begins, the inspector and the contractor need to check the plans and then physically compare the sidewalk and driveway locations to the plan locations. This needs to be done early. That way there is enough time to coordinate any of the abutting pavements with the new slab and proposed joints before the paving operation begins. Often they may involve redesigning the connection if the existing pavement is at a different elevation than what was shown on the plans. It can be embarrassing if the new drive does not lead to the garage door!



Fire hydrant placed too high



Longitudinal joints miss matched



Driveway joints don't match the highway joints



Jointing for tie-ins must be carefully considered