

## **908 CONCRETE CURBS, GUTTERS, SIDEWALKS, AND DRIVEWAYS**

Curb and gutter serves two purposes, providing a conveyance for storm water and as a means of channeling traffic. Vertical curb may also serve as a barrier to low speed traffic. The type of curb shown on the plans should not be changed without consulting the designer.

Curb and gutter serves to convey storm water to inlets, catch basins, storm sewers, and ditches. Paved streets with curbs sometimes serve as storm water channels. Both proper design and construction are required for the curb and gutter to function properly. Poor construction may result in areas which pond water, resulting in a potential safety hazard. Areas where this frequently occurs are "at grade" intersections especially in radii and valley gutters.

Curbs serve as a means of channeling traffic at intersections, ramps, traffic islands and medians, and delineating the limits of the traveled way to prevent the encroachment of motor vehicles onto sidewalks, medians, and refuge areas. Curbs also serve as an effective means to control driveway entrances. It is always good practice to consult with the property owner before final location of the depressed curb driveways. Minor adjustments to the size and locations of driveways to suit the property owner are acceptable as long as safety standards and local ordinances are not violated.

It is very important for the engineer to study the drainage conditions on any project where curbs will control or have an effect on drainage. This study should be made prior to the start of any grading work, as it may be necessary to make minor alterations in grades or minor changes in elevations of inlets to catch basins, culverts, etc., in order to assure efficient drainage. The engineer and surveyor are cautioned that two particularly troublesome areas are drainage through turnouts and areas where curb is on the high side of super-elevated portions of the roadway. The areas behind and between curbs and right-of-way line should be checked to assure drainage flows to a drain structure.

Finished appearance is of great importance in the construction of curbs and gutters as they are seen by motorists and pedestrians. Good alignment, grade, and finish are essential. Clean, straight forms, in good condition, are necessary to achieve a quality product. Flexible radius forms should be used on curves. Forms should be properly staked and braced.

The operations of mixing, placing, and consolidating the concrete should be coordinated with the finishing operations so that the pour operation does not get too far ahead of the finishers. The use of too much water while finishing the curb may make it look fine now, but in a few years traffic and run-off will wear away the thin, weak layer of grout on the surface. This is often difficult for the Inspector to enforce due to poor past enforcement, but it must be done. The Inspector should not accept concrete that has been retempered or concrete that has been in the mixer longer than the time allowed by the specifications. Since the specifications do not require vibrating concrete used in curbs and gutters, "spading" along the forms is necessary in order to work the coarse aggregate away from the faces, thus avoiding "honeycombing."

Areas of curb that are low must be augmented with fresh concrete, not grout. Under no circumstances is grout to be poured on the curb and gutter surfaces as an added layer for finishing purposes.

The use of water applied to the surface of fresh concrete to retard hardening and facilitate finishing of sidewalks and driveways should not be permitted. This practice will cause weakening of the mortar on the surface that results in cracking or scaling. If the finishers lag, the pour should be slowed.

The top, front face, and flow line of curb shall be tested with a straightedge during the finishing operations. Documentation of the fact that such testing has been done will be made in the Inspector's diary. The stationing of the section tested, the date and the results should all be included in such documentation. Each such entry is to be

signed by the Inspector. The Contractor is required to take whatever corrective measures are necessary to produce curb and gutter that will completely conform to the specifications.

Curing should follow closely behind the finishing operations, in accordance with the specifications.

Preceding portions of paragraphs on concrete curbs and gutters construction and quality control practices are also applicable to sidewalks and driveways.

Scoring of sidewalks to create weakened planes and control cracking should be in accordance with standard drawings. Expansion joint material should meet the specifications and should be placed in accordance with the standard drawing. Special attention should be given to the scoring not only in sidewalk, but also curb and gutter. Good joints are important. It should be noted that Standard Drawing C-5.20 requires a broomed finish on sidewalks.

It is crucial that the construction of sidewalk ramps conform to the Standard Drawings. The Inspector should pay particular attention to slope requirements guaranteeing that the ramp is navigable by a disabled individual. Locations which tend to be problematic are intersections in which signal poles, or fire hydrants are located immediately behind the sidewalk, potentially preventing the sidewalk ramp from maintaining the desired slope. Ramp grades must conform to the American Disabilities Act (ADA) requirements. If the ramp cannot be built as shown on the plans then contact the designer.

#### **Inspection Guidelines For Curb And Gutter**

1. When concrete pavement is to be constructed adjacent to the curb and/or gutter, has the pavement been placed prior to the construction of the curb and/or gutter?
2. Has all soft or unsuitable material been removed from the subgrade and replaced to a satisfactory depth?
3. Has the subgrade been thoroughly compacted before placing concrete?
4. Have the subgrade and forms been watered ahead of placing concrete?
5. Have expansion joints been constructed every 60 feet (18m) and at all radius points and structures?
6. Have 2-inch (50 mm) contraction joints been placed every 15 feet (4.5m) when adjacent to asphaltic concrete pavement?
7. Do the contraction joints match joints in adjacent Portland cement concrete pavement?
8. Has expansion joint filler been placed between curbs and driveway?
9. Do the lines and finish give a good appearance?
10. Has the top surface, front face, and flow line of curb been straight edged and the results documented?
11. Has the concrete, including front and back faces, been properly cured?

#### **Inspection Guidelines For Concrete Sidewalk**

1. Are forms the same depth as the thickness of the sidewalk and are they staked securely in position?
2. Has all soft and unsuitable material been removed from the subgrade and replaced to a satisfactory depth?

3. Has the subgrade been thoroughly compacted?
4. Are the forms and subgrade moistened in advance of placing concrete?
5. Has concrete been properly consolidated, and is finishing mortar worked to surface?
6. Is the concrete surface struck off with a float, troweled smooth, and then given a final fine brush finish?
7. Are joints properly formed and at the required intervals per the plans or Standard Drawing C-05.20?
8. Has the surface tolerance been checked with straightedge and documented?
9. Has the sidewalk received proper cure?