Thereafter, most of the interstate system was constructed with 8-inch-thick CRCP. “Our traveling public deserves the smoothest pavement we can provide them, and we believe that the less joints, the better,” says Moore.

Over the years, ODOT has observed their CRCP under increasingly heavy traffic loading and has made several design modifications (described on page 2) to improve the pavement performance and longevity.

“Overall, we’re satisfied, based on the excellent pavement performance we’ve experienced to-date, that our current 8-inch-thick design CRCP is adequate,” says Moore, “but we’re just starting to look into the implications of modifying our design to incorporate higher-strength concrete.”
Moore believes that ODOT’s original CRCP design standards called for both longitudinal and transverse reinforcing bars, but at some point, perhaps with the introduction of a tube-fed paving machine, the transverse steel was eliminated.

On those pavements, a number of uncontrolled longitudinal cracks formed. The lesson learned is that transverse reinforcing bars are important to holding the longitudinal cracks tight. ODOT’s standard CRCP design now includes transverse reinforcing.

**Terminal Anchors at Bridge Approaches**

At the junction between CRCP and a bridge deck, the free end of the CRCP tends to move longitudinally (unless restrained) where-as the bridge deck is fixed. This movement could create damage at the pavement-deck interface if not properly accommodated.

In the past, ODOT typically used a terminal anchor system with lugs to restrain the CRCP. Like many states, ODOT then moved to wide-flange beam joint to accommodate the longitudinal movement.

**Wider Lanes**

ODOT specifies a 14-foot-wide lane for the outside (right) lane while still delineating (with striping) a 12-foot-wide lane. The extra two feet of CRCP that overlaps onto the shoulder provides edge support equal to a full-width tied shoulder without the joint.

The pavement on the traveled lane itself experiences interior loading as opposed to edge loading. This extra edge support reduces the potential for edge or longitudinal cracking.

**Repair Methods**

ODOT has not had to fully replace any of its CRCP and there have only been a limited number of locations statewide where patching or repairs were required. Oregon has seen very little spalling, although some longitudinal cracks have opened up in segments of CRCP without transverse steel.

Where full-depth repairs are necessary, ODOT makes a partial-depth sawcut around the damaged area, chips out the concrete around the reinforcing bars, and replaces the transverse steel.

Moore advises to extend the patch at least 3 feet beyond the crack or cracked area, noting that in one instance in Oregon, the repair area was cut off at the terminus of the crack. After the repair was completed, the crack continued to propagate outside of the repair area, necessitating additional patching.

**Overlays**

To get even longer life out of its CRCP, ODOT uses a hot-mix asphalt overlay (either 2 inches or 4 inches thick, depending on the condition) on pavements that have excessive surface wear (from studded tires, for example). “We use overlays so that we don’t have to rebuild,” says Moore. “We can get another good eight or ten years out of our heaviest-loaded pavement that way.”