Joints in Concrete Pavements

Part III – Joint Spacing for Parking Areas

By Randell C. Riley, P.E.

One of the more frequent questions I get about joint layout and joint spacing is: “How far apart should the joints be?”

Implied in the changing construction of the question is usually the word cut, formed or tooled. Which type doesn’t make that much difference. The spacing does, and for this reason it is a very good question.

Over the years I have been involved in pavement design I have seen a gradual evolution in thicker and shorter joint spacings. When I first started in the business, the “rule of thumb” was 2½ times the thickness in inches expressed in feet or about 20 times pavement thickness. For example, a 6-inch pavement would require about a spacing of 12 feet. In recent years as an effort to more tightly control the incidence of random cracking, the industry has suggested tightening the tolerances still further. A common “rule of thumb” today is 17 times pavement thickness on granular subbase or soil and 21 to 23 times pavement thickness on stabilized material or pavements placed as some type of overlay of an existing pavement.

To most people unfamiliar with pavement design, the latter recommendation seems contrary to common sense. Why would joint spacing less than a stabilized platform than on subgrade or granular material?

In reality, the harder the platform on which the pavement is placed, the greater impact of differential temperature shrinkage and drying shrinkage on the structure. On a table or very hard platform the pavement will curl and warp.

The split of the slab corners and edges in pavement (sometimes observed in warehouses) results in stress being induced, not just by vehicle loading, but by the weight of the concrete hanging unsupported at joints. Granted that the space is usually less than a few thousandths of an inch, but the concrete slab it makes a difference. As soon as the concrete slab, whether at the middle of the slab or at the corner, the tensile stresses can exceed the strength of the concrete and cracking will result.

Joints placed on softer subgrade or unbound granular material can actually settle into the platform resulting in more uniform support. Think of the analogy of setting an ice cube on a table - the ice is supported uniformly, whereas the water will not hold the same weight as the table.

This is what you have to think about when planning pavement joints for a parking lot. The ratio of shrinkage to joints is higher for a concrete slab supported on soils than on a hard subgrade. The larger the joints, the higher the potential for cracking, and the smaller the joints, the less likely the pavement will crack. The ratio of shrinkage to joints is the same for all types of paving materials. Therefore, the ratio of shrinkage to joints is higher for a concrete slab supported on soils than on a hard subgrade.

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guidelines as to the target joint spacing. But remember a place to start. Shorter joint spacing is almost always better. If there is one overriding concept in figuring out what the joint spacing should be, keep in mind one thing... In my professional career as a concrete paving engineer, I have never been called to look at a problem caused in a project by having too many joints!

Next time, move on to parking lot jointing and the "Tension Ring."

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About Randall C. Ray, P.E.

Randall Ray is an Engineering Consultant for the Illinois Ready Mixed Concrete Association and the Central States Concrete Paving Association. He is actively involved in the day-to-day promotion of long-life quality concrete pavements. He can be reached at 217-793-9353 or on the internet at randell@hrms.com.