



Memo

Office of Materials and Road Research
Pavement Section

Office Tel.: 651 779 5563
Fax: 651 779 5616

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To: Metro Materials Engineers
Metro Soils Engineers

From: Joseph Meade
Pavement Engineer

Subject: Interim Thickness Design for High-Performance Rigid Pavement

This memo outlines the recommended process for structural design of high-performance rigid pavement on urban high-volume facilities in the metro area. Previously I-35W (SP 2782-268) was designed and constructed using this design. The design addresses premature deterioration of transverse joints and load transfer that Mn/DOT has experienced. Through enhanced dowel bars and increased thickness an extended performance life well beyond our current experiences should be achieved. In very high traffic areas the cost of improving pavement performance can easily be justified by the reduction in user costs due to longer pavement performance.

Thickness Design – Alternate Methods

Adjust the design R-value using the current process as outlined in the Design Examples memo from Duane Young dated May 11, 1995.

- Alt. 1 Design the section using 35-year forecast CESALs. To obtain a structural section for a 60-year period adjust the thickness by adding 25 mm (1 in.).
- Alt. 2 Adjust the 35-year CESAL forecast to a 60-year level before running the design program. This can be approximated by multiplying the cumulative 35-year CESAL forecast by two.

Design with jointed, plain PCC having 4.6 m (15 ft) joint spacing over 100 mm (4 in.) Class 5 aggregate base and a modified granular subgrade. Shoulder design shall be tied PCC with thickness equal to the mainline.

Design Details

- Dowels – Provide for 37.5 mm (1.5 in.) by 457 mm (18 in.) solid stainless steel dowel bars on all mainline paving and shoulders that are 3.6 m (12 ft) or greater in width. Ramps may be designed with 31.25 mm (1.25 in) solid stainless steel dowel bars. For all shoulders less than 3.6 m (12 ft) in width, which may be intended to carry traffic, either solid stainless steel dowel bars or grout-filled stainless steel tube dowel bars may be used. Dowels are spaced at 300 mm (12 in.) on center.
- Joint Sealant – Use preformed elastomeric compression seals meeting Specification 3721.

- PCC specifications – Use the most current high-performance PCC water/cement ratio specifications developed by the Concrete Unit for mix design criteria.
- Modified Select Granular – It is recommended that Specification 3149.2B2 be modified to ensure a granular layer that will provide stability and drainage. This can be achieved by placing controls on the percentages passing the #10, #40, and #200 sieves. Change first sentence of 3149.2B2 to read:

“Select granular borrow, for special use in embankment or backfill construction or other specified purposes, may be any pit-run or crusher-run material that is so graded from coarse to fine that, of the material passing the 2 mm sieve (#10), no more than 65 percent shall pass the 0.425 mm (#40) sieve, and no more than 10 percent shall pass the 0.075 mm (#200) sieve.”