

Superpave mix designs offer more options

Standard specs for designing asphalt pavement mixes using Superpave designs are now available. Superpave mixes offer more options for traffic loads and temperature extremes than previous design systems.

Since October 2000 the Wisconsin Department of Transportation has required Superpave designs for all its asphaltic pavement. As a result, most state asphalt suppliers are geared up to deliver the new higher-tech materials for the spring 2001 construction season.

A chart prepared by the Wisconsin Asphalt Pavement Association helps simplify the mix design choice. For most local applications the main difference from the old spec system is that there are now two mix designs for the old Moderate Volume (MV) category. A different mix is recommended for major arterials, local business streets and medium industrial streets with heavier traffic conditions as measured in ESALs or Equivalent 18,000 pound Single Axle Loads.

"The main difference is that at the upper end of medium volume mixes we're looking for more angular sands than before, getting a little more support out of the aggregate structure," says Tom Brokaw Asphalt Aggregate and Soils Engineer at the WisDOT Bureau of Highway Construction.

With the chart and guidelines from WAPA it shouldn't be too hard to spec a Superpave design. "You really don't have to know the technical reasons behind the selections," Brokaw says.

New binder grading system

There is a new system for specifying binders, the liquid asphalt component of a pavement mix. Performance Grades have replaced Penetration Grades and Viscosity Grades and are based primarily on climate conditions.

For lower volume traffic classes there are two recommended Performance Grades: PG 58-28 and PG 64-22. The first number is the maximum pavement design temperature in degrees

Celsius and the second is the minimum pavement design temperature. The maximum affects a pavement's rutting resistance and the minimum affects low temperature cracking.

"Normally in Wisconsin we have been specing PG 58-28 which pretty much compares to a 120-150 penetration graded material that we used in the past," says Brokaw. "We've found in some situations where there is a lot of traffic stopping and turning at intersections you can get depressions or scuffing at high temperatures. So we are trying to bump up that high temperature end by adding polymers to the asphalt." The PG 64-22 grade (which is close to 85-100 penetration type) stays stiffer at higher temperatures to resist rutting.

Choosing a PG category also depends on whether the surface will be laid on a new base or existing concrete or asphalt. Since an old pavement will produce reflective cracking in the new surface, there is currently no proven benefit in modifying the binder to resist cracking at lower temperatures.



Adding polymers raises the cost of the binder. Although it varies depending on the selected range, WisDOT has been paying \$30-\$70 more per ton of liquid asphalt for polymers on top of about \$160 per ton for unmodified (or natural) binder. To save money, Brokaw recommends using an unmodified binder on the lower layer because the maximum temperatures stay cooler and minimums don't get as cold in that layer.

"Locals should also keep in mind that you don't want to use too many different binders on a project because it costs the contractor more to have multiple storage tanks on site," says Brokaw. He recommends a maximum of two per project.

Current specs are on the WAPA web page: www.wispave.org. Use the form on page 7 to request WAPA's handy design guide card from the T.I.C.

WAPA DESIGN GUIDE UPDATE

Traffic Class	Design Daily ESAL*** Range	Old Specs	Superpave Type	Typical Examples of Use
I	<1	LV	E-0.3	<ul style="list-style-type: none"> Residential driveways Parking lots, 50 stalls or less School areas and playfields Seasonal recreational roads
		LV	E-0.3	
		LV	E-0.3	
		LV	E-0.3	
II	1-5	LV	E-0.3	<ul style="list-style-type: none"> Parking lots, more than 50 stalls Residential streets and low volume rural roadways
		LV	E-0.3	
III	6-50	MV	E-1	<ul style="list-style-type: none"> Collector streets and other roadways Light industrial lots
IV	51-275*	MV	E-3	<ul style="list-style-type: none"> Local Business Streets Major arterial streets Medium industrial streets/lots
		MV	E-3	
		MV	E-3	
V	276-1000**	HV	E-10	<ul style="list-style-type: none"> Heavy truck terminals/truck stops Heavy industrial drives/lots Bus stops
		HV	E-10	

*Note: Traffic Class IV under certain traffic conditions at the high end of the design daily ESAL range, i.e., heavy loads at slow speeds, lots of stop and go conditions; consideration should be given to changing the Superpave type or binder properties. Contact WAPA or your local WAPA contractor for more information.

**Note: Designs for extreme traffic conditions not covered by the table are available by contacting WAPA or your local WAPA contractor.

***Note: ESAL is defined as Equivalent 18,000 pound Single Axle Load