



Ohio Smoothseal

HMA PAVEMENT PRESERVATION OPTION

Local and state transportation agencies in Ohio started to use Smoothseal™ in the early 1990s because they were looking for a hot mix asphalt (HMA) alternative pavement preservation option. They were looking for a speedy, effective, durable method of resurfacing their roads and streets other than traditional microsurfacing or chip seals.

Seeing the need for a thin-lift hot mix pavement preservation option, representatives of Flexible Pavements of Ohio (FPO), the state hot mix paving association, developed what is known today as Smoothseal. Smoothseal is a heavily polymer-modified hot mix that incorporates styrene butadiene latex. The mixture has a fine gradation comprised of a sprinkling of coarse aggregate — 8s and 9s — with mostly natural and manufactured sand. The Marshall Method was used for developing the mix design.

In recent years pavement preservation techniques have seen renewed interest in Ohio. Like many departments of transportation, the Ohio DOT is seeking to be fiscally prudent with its resources. In these later years, when the ODOT re-initiated pavement preservation measures

throughout the state, they reverted to the use of traditional micro-surfacing and chip seals. So, FPO reminded them, “Wait, you have specifications for HMA microsurfacing called Smoothseal.” So ODOT agreed to do some Smoothseal projects. And they are still using it.

Type A and Type B

ODOT adopted two versions of Smoothseal, Type A and Type B. Type A is an all sand mix using 8.5 percent asphalt binder. It was first used by ODOT in the Akron, Canton and Cleveland areas.

Type A has been used on non-high-speed roads and four lane boulevards by a number of urban communities. It has

been used for rural roads and park roads and calls for a 5/8 to 3/4-inch thickness.

Smoothseal Type B, with about 6.5 to 7.0 percent asphalt binder content and a 5 percent polymer loading, has performed well on the Georgia Wheel Tester (a rut-testing device) while being compactable during construction. ODOT’s Toledo district was an early user of Type B, and its use has been spreading around the state. It is typically placed in a 3/4- to 1 1/2-inch thickness.

Type B has been used on both residential roads and streets and also on interstate pavements. Asphalt industry designers expect the various Smoothseal projects to

SEIVE	TYPE A	TYPE B
1/2 inch (12.5mm)		100
3/8 inch (9.5mm)	100	95 – 100
No. 4 (4.75mm)	95 – 100	85 – 95
No. 8 (2.36mm)	90 – 100	53 – 63
No. 16 (1.18mm)	80 – 100	37 – 47
No. 30 (0.600mm)	60 – 90	25 – 35
No. 50 (0.300mm)	30 – 65	9 – 19
No. 100 (0.150mm)	10 – 30	
No. 200 (0.075mm)	3 – 10	3 – 8

SMOOTHSEAL AGGREGATE GRADATION REQUIREMENTS

last between 10 and 15 years. ODOT also is placing Type B on the Ohio Test Road (concrete on one side, asphalt on the other) to test its use as an impermeable surface mix that can provide long pavement life.

Both types of Smoothseal can be used as a viable alternative to a conventional HMA overlay. The Ohio Asphalt Pavement Alliance has promoted Type B rather than Type A because it requires less asphalt binder content and is a coarser mix, which improves rutting resistance. Some local agencies that previously didn't consider using Smoothseal are now looking at Type B.

ODOT Experience

ODOT has had good experience with both types. "I've had more experience with Type A than Type B," says Jim Marszal, ODOT Pavement Engineer in the Cleveland area. "We cover three counties and many of our roads are urban and suburban, and some are rural. In this District, we use Smoothseal primarily as an overlay to restore rideability. As far as performance and durability, we expect the Type A sections to last 8, 10 or 12 years, or longer. So far I've done one project using Type B, although I am considering several others.

"In Type A," says Marszal, "there is a little more asphalt binder along with styrene butadiene rubber or styrene butadiene styrene, and it pays off in durability. In the Type B, we use slightly larger aggregate and less modified asphalt binder in the mix. This provides some additional structure or strength for use in heavier traffic applications."

Smoothseal or HMA?

Ohio contractors think that Smoothseal compares favorably with traditional HMA overlays. "If it is the proper thickness, and under proper conditions, yes, Smoothseal can compete," says Larry

Shively of the Shelly Company. "If it is placed over a roadway in need of extensive surface repair, then Smoothseal is not as effective as a regular HMA overlay.

"Type B has more aggregate matrix than Type A," says Shively. "Type A is composed of natural sands, but Type B requires crushed faces and limestone coarse aggregate for heavier traffic. Type B can take the place of a traditional HMA

overlay if it contains the proper aggregate gradation. Traditional overlays are usually 1 1/4 to 1 1/2 inches in thickness."

Shively says that Smoothseal roads are getting good density, "but ODOT gives us a method specification to go by. We use a specific type of roller and a specified rolling pattern. We don't often check density because we are following the ODOT specification."

Is It Durable?

Shively adds that so far his company has not seen any problems with Smoothseal on any of the projects. “We are using Smoothseal in both rural and urban areas. We did a few jobs in southern Ohio, but most of the jobs we’ve done are in the middle of the state. Some jobs are five years old; some are only two years old. So far we have not heard anything negative.”

Finally, Shively and other contractors expect good durability from Smoothseal. “If we use it for its proper purpose, for pavement preservation, to prolong the surface life of roads that are not in need of extensive repair, then we can expect good durability.”

Durability is a big question in the minds of city street engineers, says Eric Smith, City Manager of Englewood, Ohio. “We began using Smoothseal and found it was not only more durable, but was also more

economically viable. The Smoothseal is lasting ten years, while the slurry was lasting only five. The Smoothseal is thick enough and tough enough to resist reflective cracking. We also found that Smoothseal was less expensive than a conventional HMA overlay.

“We used the Smoothseal on residential streets, usually two-lane residential streets, with an average daily traffic between 200 and 500. Sometimes we used it on collectors, but mostly on residential streets. We put down a 3/4-inch or 1-inch overlay over the entire roadway. We don’t use Smoothseal on state roads or interstates. We use a 1 1/2-inch HMA overlay on those.”

Smith says Englewood uses Type B Smoothseal exclusively. “We found it works better for our purposes than Type A. Type B takes only two hours to set up, then you can drive on it.”

Problems with Smoothseal?

Smith doesn’t see any critical problems with Smoothseal, but he has found the modified mix is highly susceptible to cool temperatures. “When the weather is hot, Type B works well,” says Smith. “When the weather gets cooler, like late October, it is hard to work with—it won’t compact easily.”

Smith says that after paving and rolling, Type B looks as smooth as a billiard table. He adds that even though it looks smooth, there is no problem with skid resistance, even when it rains.

Future Applications

Smith says that quite a few communities in Ohio are beginning to use Smoothseal. Although community engineers are often reluctant to try new things, Smoothseal is starting to have a wider and wider appeal. ▲