



**Research
Development
and Technology
Division**

Missouri
Department
of Transportation

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NovaChip

Description:

NovaChip is a paving process that places a thin, coarse aggregate hot mix over a special asphalt membrane. The special NovaBond membrane prevents water leakage and provides a superior bond to the old asphalt or concrete surface. NovaChip combines a surface seal with a hot mix level-paving surface and the flexibility of a thin maintenance treatment, which results in a durable surface. NovaChip can be used as preventative maintenance or as a surface rehabilitation treatment. The NovaChip results in a thinner surface than hot mix making it suitable where overheight clearance and drainage profile problems may occur. It's good for high traffic areas because the process moves quickly and all in one pass. This means the road will be opened sooner resulting in less traffic delays. Currently MoDOT uses hot mix and microspheres for its overlays and chip seals for surface restoration and skid resistance. The NovaChip is more durable than a standard chip seal and has no loose chips to contend with. It may also enhance our ability to correct rutting, lengthen asphalt pavement life cycles, and reduce or eliminate wet pavement accidents by providing a minimal hydroplaning surface on the roadways.

Advantages/Disadvantages:

One of the NovaChip advantages MoDOT is most interested in is the ability of the overlay to dispose of water quickly off the surface thus reducing roadway spray from vehicles and providing greater visibility in wet weather. This is accomplished through its coarse aggregate matrix. Along with a reduction in roadway spray, the skid resistance of NovaChip seems to be good which makes the product desirable at locations where loss of traction due to wet pavement is an issue. Other advantages of NovaChip are its quick, one-pass, thin lift, and estimated long lasting performance.

One disadvantage is some areas of the initial test section, which is on the north side of St. Joseph placed in October 1998, have developed shelling problems. From a field evaluation in January 1999, it was noticed that a good deal of the loose aggregate laying on the shoulder was coming from snow plow damage to the inside lane edge of the NovaChip pavement. This was apparently occurring when the inside shoulder was being cleared of snow. There was also damage showing up in the middle of the lanes, some of which could be attributed to snow plow gouge. However, some irregular looking areas were noted at the time of placement of this initial test section. These irregular looking areas may have been the cause of the pavement to be more susceptible to holding moisture, bringing about accelerated effects from freeze/thaw cycles or possibly allowing snow plows to penetrate down into the surface thus triggering shelling to occur.

A second test section was placed on the south side of St. Joseph in July 1999. It is hopeful this second test section will provide a more durable result. It is in the process of going through its first winter season in 1999 - 2000.

Cost:

- For a 1-inch hot mix overlay, the estimated life is 4 to 10 years. Assuming an average life to be 7 years at a cost of approximately \$1.36/sq. yd, this equates to an approximate annual cost of \$2,570 per two-11ft. lane miles.

- A Ralumac surface is expected to have an equivalent life and cost figures of a hot mix overlay.
- For Chip seals, the estimated life is 4 to 10 years. Assuming an average life to be 7 years at a contract cost of \$0.75/sq. yd, this equates to an approximate annual cost of \$1,400 per two-11ft. lane miles.
- For a standard 3/8" to 3/4" NovaChip hot mix surface, the estimated life is most likely comparable to a hot mix overlay of 4 to 10 years. Assuming an average life to be about 7 years at a cost of approximately \$3.00/sq. yd, this equates to an annual cost of \$5,500 per two-11 ft. lane miles.

Conclusions:

One conclusion that can be drawn at this time is that NovaChip has proven itself to be a wearing surface which sheds away water from the surface to reduce hydroplaning and reduces road spray from vehicles thus providing greater visibility for drivers. The reduction of hydroplaning should allow more of the vehicle tire to be in contact with the road.

This is evident in the decreased amount of reports of out of control accidents at these test sites. Another conclusion, which can be drawn at this time, is the drastic cost difference between the NovaChip surface and the 1-inch hot mix or the chip seal treatments. Using the costs from the test section, NovaChip is approximately twice the price of hot mix.

Further monitoring during this evaluation will determine the durability of NovaChip and conclude if NovaChip will or will not be another pavement surface solution tool. Upon completion of this evaluation, a final report will be distributed with the appropriate recommendations.

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