



LHTAC

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CHIP SEALING

Burleigh County, North Dakota

PROBLEM:

Chip sealing has always been a valuable maintenance and preservation operation performed on hot bituminous pavements. This is a fairly routine operation and is simply a layer of bitumen sprayed onto a roadway followed by a layer of cover coat aggregate usually consisting of a fairly open-graded, fractured rock material. Generally, the quantity of chip material applied is sufficient to cover the bitumen shot completely to prevent bleeding or tracking. If subsequent warm air temperatures or heavy traffic causes bleeding after application, a blotter sand material is spread to absorb or shield the bitumen material until it fully cures out.



A minimal amount of cover coat aggregate is used in Burleigh County's new chip sealing method.

The general practice has some undesirable effects. The worst being the presence of loose rock particles that readily become airborne by traffic which, in turn, can break vehicular wind shields and headlights. This excess amount of chip float, that never had a chance of being adhered to the roadway, also causes problems of disposal and actual waste of the chip product.

SOLUTION:

For the last several years, Burleigh County has utilized application methods that greatly minimize these adverse effects of chip sealing. Chip seal work is not performed in-house. The plans call for usage of a minimal amount of cover coat aggregate. The amount is minimal to the point that the loaded chip trucks following the chip spreader would leave bitumen tracks. The Burleigh County plan mandates sanding immediately and continuously right after the chip spreader passes, before rollers hit the fresh mat. This sanding is generally applied at the rate of 4 to 6 pounds per square yard, or adjusted to provide the necessary blotting function. The common "whirly bird" type sander works well to apply the necessary amount of sand in a uniform and non-wasteful manner. Multiple sanding units are required to keep up with the normal chip sealing marching speeds. The result is a "leaner", tighter, mat that is adequately blotted without the large amount of excess chip float common to most chip seals. Unfortunately, while the float amount is greatly reduced, there is still float to deal with. Burleigh County also mandates that float removal be performed in a timely manner, within 2 to 4 days of the application date.

COST SAVINGS AND SAFETY:

Burleigh County has not spent a lot of effort attempting to document actual dollar cost savings resulting from this procedure. There is certainly a savings of cover coat material and a reduction in the likelihood of damage to vehicles caused by flying chip float. Consideration of general history shows that approximately 30 pounds of chips per square yard end up being an average project usage. With diligent and constant monitoring of the chip spreading operation, this usage average drops



A "whirly bird" sander applies the necessary amount of sand in a uniform manner.

to approximately 25 pounds of chips per square yard. On a typical two lane, 24' pavement, the savings of 5 pounds per square yard extends to 35.2 ton of cover coat material per mile. The most current cover coat bid price in Burleigh County has been \$43.50 per ton, furnished and applied. There is no benefit in purchasing an extra 35.2 ton of relatively expensive cover coat material to merely provide a blotting function. There is also a cost savings in the area of float removal. If the float is not there, it doesn't need to be removed or picked up.



Rollers finishing the newly chip sealed road.

There are a few other fairly unique items utilized in Burleigh County chip seal plans that have worked well for our purposes. A highly fractured aggregate is preferred, but usually a minimum of 50% single face fracture is specified. A larger particle size is also dictated on Burleigh County specifications. While 100% of the cover coat must pass a 1/2" screen, a range of 10 to 30% of the material must be retained on the 3/8"

screen. This larger particle size helps hold vehicle tires up, out of the bitumen and increases the roadway surface friction coefficient. Certainly excess chip float having these particle sizes would exacerbate the damage to passing vehicles, but the lean cover coat layer, immediate and continuous sanding, and prompt float removal have combined to almost completely eliminate any glass damage complaints. Also, safety to the traveling public, not having to drive on as much loose aggregate, is another benefit.

Reference: The Centerline, Vol. 23, No. 1