Alberta

DESIGN BULLETIN #102

Design Criteria for Selection of Seal Coat Type and Other Surface Treatments

Summary

This bulletin updates the criteria listed in the document "Guidelines for Selecting Type of Seal Coat on a Paved Surface" in Appendix F of the Engineering Consultant Guidelines for Highway, Bridge and Water Projects – Volume 1 Design and Tender (2013).

The process for inspecting and rating candidate projects for a seal coat treatment is described in the document "Alberta Transportation Guidelines for the Assessment, Rating and Priorization of Pavement for Seal Coat" which can be accessed through the Alberta Transportation web-site: http://www.transportation.alberta.ca/629.htm.

Implementation

This Design Bulletin is effective immediately.

Selection Criteria

The type of seal coat application is primarily based upon traffic volumes as shown in Table 1.

Table 1 Seal Coat Selection Based Upon Traffic Volume

Traffic Volume A.A.D.T.	Seal Coat Type	Specification for Aggregate (see Specification 3.2 Table 3.2.3.1)	
		Designation	Class
> 20,000 vpd	Micro-Surfacing[1]	Specification 3.26 ISSA Type III	
> 10,000 – 20,000	Chip Seal	3	12.5 AW[2]
1,000 – 10,000	Chip Seal	3	12.5 BW[2]
< 1,000	Graded Aggregate Seal	3	12.5 C[2]
< 500	Double Seal Coat[3]	3	16[2] (both applications)
< 300	Restorative Sand Seal[4]		

Notes:

1. High traffic volumes that require work to be completed during off-hours (i.e. night time work). Chip seal coats are not appropriate for this type of work.
2. Indicate aggregate class in the contract documents and Unit Price Schedule.
3. Double Seal coat is occasionally applied to a base structure (Granular or Full Depth Reclamation) in lieu of an asphalt pavement.

4. A lower cost treatment that is occasionally used on very low volume highways where a rejuvenating type binder is used to protect and restore an aged oxidized pavement. Has also been used to treat the existing paved shoulders on mill and inlay paving projects.

Other Considerations

1. Chip Seal using a Polymer Modified Binder

Specification 3.24 Chip Seal Coat specifies that the Contractor is to supply a cationic, rapid set asphalt binder. On multi-lane divided highways the Consultant is to specify a CRS-2P (polymer modified grade). The polymer modification is to increase early stage chip retention and reduce potential problems associated with loose chips. For estimating purposes the polymer modified asphalt has a premium cost of $\$0.20/m^2$.

2. Fog Coat Application

Fog coating a chip seal coat after sweeping has been trialed by the Department as a means to reduce loose chips. However, as normal practice, the Department does not use this procedure, except in rare cases where loose chips are caused by construction problems (i.e. under application of binder, poor rolling, cool ambient temperatures, etc.). Accordingly, this procedure is not designed or included within seal coat contracts but is used as a field decision to mitigate construction related problems.

3. Racked-In Chip Seal

A racked-in chip seal is similar to a regular washed chip seal except the aggregate is spread through two applications. In this process the binder type and application rate is the same as a regular seal coat. The first aggregate distribution consists of a Des 3 Cl 12.5 AW/BW product and is applied at roughly 75% of the total application rate. The second aggregate distributor follows closely and spreads smaller size washed chips (8 mm top size). The smaller surface chips are intended to reduce risks associated with loose chips. The premium cost in using the racked-in system is estimated to be $\$0.50/m^2$. The longer term in-service performance of the racked-in system is considered to be equivalent to regular chip seals.

This type of chip seal application may be selected by regional staff for use in situations where local traffic conditions could be sensitive to chip sealing operations and associated loose aggregate issues. The choice of Class 12.5 AW or BW aggregate is as per Table 1 (above). The North Central region has the most experience in using this type of seal coat.

4. Fibre-Reinforced Membrane System

A seal coat application (usually chip seal) where a special asphalt distributor blows short strands of fiberglass into the sprayed binder prior to the aggregate laydown. This specialized application has been trialed by the Department to treat a structurally sound pavement with surface cracking more extensive than that normally treated with a regular seal coat. This system is not normally used by the Department and Technical Services Branch should be consulted prior to using.

5. Asphalt Binder Pre-Spray

In this process a regular chip seal application is used except that two asphalt distributors, working in close tandem, are used to spray the binder. The first distributor applies a light application across the mat except within the wheel paths. The second distributor applies the binder across the full travel lane. In this process the more heavily travelled wheel paths have a slightly lower binder application in order to be less prone to asphalt “flushing” problems. The chip seal outside of the wheel paths have a slightly higher binder application rate in order to better increase aggregate retention. This system is not normally used by the Department and Technical Services Branch should be consulted prior to using.

6. Micro-Surfacing

Specification 3.26 Micro-Surfacing describes a slurry type application to be chosen as outlined in Table 1. This application is also better suited for urban and semi-urban applications in terms of reduced loose chips and quicker opening to traffic. The micro-surfacing material may also be used for rut-filling applications either with or without a subsequent pass across the entire travel lane.

Further Guidance

Questions on the use of this design bulletin may be directed to the Pavement Engineering section of the Technical Services Branch.

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