

## **Engineering Brief # 44**

November 2, 1989

Subject: INFORMATION: Engineering Brief No. 44  
Coal-Tar Sealer/Rejuvenator

FROM: Manager, Engineering and Specifications Division, AAS-200  
TO: All Regions

Attn: Managers, Airports Division and AAC-960

Engineering Brief No. 44 provides information and guidance for the use of a coal-tar base material as a fuel resistant pavement sealer and rejuvenator.

The purpose of engineering briefs is to keep Airports field offices informed of construction materials and methods which are being tried, but which are not necessarily known to the Regions and ADO's. The information contained in this brief is not to be construed as general approval by the Office of Airport Safety and Standards. Any use of coal-tar sealer/rejuvenator will require prior approval by this office.

Any comments you have concerning this brief will be appreciated.

ORIGINAL SIGNED BY  
JOHN L. RICE  
for  
Robert Bates

ENGINEERING BRIEF NO. 44

COAL-TAR SEALER/REJUVENATOR

Background.

Asphalt hardening is an oxidation process and as such is a function of its exposure to air on the surface and within the pavement. If circulation of air through the interconnected void spaces can be prevented, the rate of hardening of the asphalt will be reduced and the life of the pavement extended. Therefore, it follows that a sealer which will close the surface pores will lengthen the life of the pavement.

While considering the problems relating to aging asphalt pavements it appeared that a tar-based product would penetrate into an old bituminous surface then, with time, re-plasticize or rejuvenate the asphalt so that cracks and crazes would heal under traffic.

Accordingly, many laboratory formulations were tried and numerous field evaluations were made resulting in a coal-tar sealer/rejuvenator. This material is a coal-tar base product

designed to reconstitute aged asphalt and restore its flexibility and ductility. It is cold-applied and preserves and protects the pavement by a double action process. Part of the material penetrates into the asphalt and restores its plasticity and lowers the viscosity while the other portion remains on the surface and protects the pavement against fuel spill damage and the intrusion of air and water.

The material is very stable and can be stored indefinitely.

Construction.

The pavement to be treated should be weathered. The coal-tar sealer is applied through a pressure distributor at a temperature of 60 to 120 degrees F. Application rates vary and are dependent on the condition of the pavement. The rate is determined by applications made by the contractor on a test strip and normally runs between 0.05 and 0.08 gal/sy. The cost is about \$0.60 to \$0.90 per square yard. The cure time before traffic is allowed on the pavement is about 24 hours depending on the ambient temperature.

After application the sealer becomes an integral part of the asphalt pavement, not merely a surface coating and friction characteristics of the pavement are not affected appreciably.

Coal-tar sealer/rejuvenator has been applied at several airport pavements to date and appears to be performing satisfactorily.

Based on successful use on airport pavements, this material may be considered as an alternative to coal-tar emulsion seal coats where the primary purpose is to protect the pavement against damage from fuel spills. When this product is specified on a project, the design engineer must furnish evidence to show that equal or better performance can be achieved than with conventional seal coats, commensurate with any increase in costs. Approval for each project will be required by AAS-200 so that we will be aware of the locations where it has been used and can monitor and evaluate its performance.

Attached is a specification for coal-tar sealer/rejuvenator for your use.

Refer to EB44B, Revised Coal-Tar Sealer/Rejuvenator Specification, dated May 21, 2008.

#### COAL-TAR SEALER/REJUVENATOR

##### DESCRIPTION

1.1 This item shall consist of a coal-tar sealer/rejuvenator applied on a previously prepared bituminous surface, in accordance with these specifications, for the areas shown on the plans or as designated by the Engineer. The purpose of this sealer is to provide a fuel resistant surface and to rejuvenate the asphalt binder.

##### MATERIALS

2.1 BITUMINOUS MATERIALS. The bituminous material shall be composed of coal-tar oils and coal-tar prepared from a high temperature, coal-tar pitch conforming to the requirements of ASTM D 490, Grade 12. The material shall meet the requirements of Table 2.

TABLE 2. PROPERTY REQUIREMENTS

<u>Test Property</u>	<u>Test Method</u>	<u>Requirements</u>
<u>Specific Gravity @ 25/ 25 C</u>	<u>ASTM D 70</u>	<u>1.04 min.</u>
<u>Viscosity Engler 50 cc @ 50 C</u>	<u>ASTM D 1665</u>	<u>8.0 max.</u>
<u>Water, % by volume</u>	<u>ASTM D 95</u>	<u>2.0 max</u>
<u>Distillation</u>	<u>ASTM D 20</u>	
<u>% by weight to 170</u>	<u>20 max</u>	
<u>270</u>	<u>20-50</u>	
<u>300</u>	<u>60 max</u>	
<u>Softening Point C R&amp;B Residue above 300 C</u>	<u>ASTM D 36</u>	<u>65 max</u>

CONSTRUCTION METHODS

3.1 WEATHER LIMITATIONS. The coal-tar sealer shall be applied only when the existing surface is dry and the pavement surface temperature is above 50 degrees F.

3.2 EQUIPMENT. The Contractor shall furnish all equipment, tools, and machines necessary for the performance of the work.

a. Pressure Distributor. The distributor shall be designed, equipped, maintained, and operated so that coal-tar sealer at even heat may be applied uniformly on variable widths of pavement at the specified rate.

b. Power Broom. A power broom and/or blower shall be provided for removing loose material from the pavement surface.

3. 3 CLEANING EXISTING SURFACE. Prior to placing the sealer, the surface of the pavement shall be clean and free from dust, dirt, or other loose foreign matter. When directed by the Engineer, the surface shall be cleaned with a power broom.

3. 4 TEST SECTION. prior to full production the Contractor shall place a series of one-square yard test sections at the rate of 0.05, 0.06, and 0.075 gallons per square yard. The area to be tested will be designated by the Engineer and will be located on the existing pavement. The Engineer shall examine the test sections 24 hours after placement and advise the Contractor of the application rate for the remainder of the project. A test section will be required for each different type of pavement surface.

3. 5 APPLICATION OF SEALER/REJUVENATOR. The coal-tar sealer/ shall be uniformly applied with a bituminous distributor at the rate determined in paragraph 3. 4. The application rate shall not be varied without the approval of the Engineer. The application temperature shall be between 60 and 120 degrees F.

Following the application, the surface shall be allowed to cure without being disturbed until the sealer has dried out. This period shall be determined by the Engineer. Suitable precautions shall be taken by the Contractor during this period, including the application of any sand necessary to blot up excess material.

3. 8 BITUMINOUS MATERIAL CONTRACTOR'S RESPONSIBILITY. Samples of bituminous materials that the contractor proposes to use, together with a statement as to their source, must be submitted and approved before using the material.

The Contractor shall furnish the manufacturer's certification that each consignment of coal-tar sealer shipped to the project meets the requirements of the specification. The manufacturer's certification shall not be interpreted as a basis for final acceptance. Any certification received shall be subject to verification by testing random samples received for use.

3. 9 FREIGHT AND WEIGH BILLS. The contractor shall furnish the Engineer receipted bills when railroad shipments are made, and certified weigh bills when materials are received in any other manner, of the coal-tar sealer used in the construction covered by the contract. The Contractor shall not remove material from the tank car or storage tank until the initial outage and temperature measurements have been taken by the Engineer, nor shall the car or tank be released until the final outage has been taken by the Engineer.

METHOD OF MEASUREMENT

~~4.1 The coal-tar sealer shall be measured by the [gallon(liter) ]  
[square yard{square meter}]~~

BASIS OF PAYMENT

~~5.1 Payment shall be made at the contract unit price per  
[gallon(liter)] [square yard(square meter)] for the coal-tar  
sealer.~~

~~Payment will be made under:~~

~~Item 5.1 Coal-Tar Sealer--per[gallon(liter)][square yard(square  
meter)]~~

TESTING REQUIREMENTS

<del>ASTM D 20</del>	<del>Distillation of Road Tars</del>
<del>ASTM D 36</del>	<del>Softening Point of Bitumen</del>
<del>ASTM D 70</del>	<del>Specific Gravity of Semi-Solid Bituminous Materials</del>
<del>ASTM D 95</del>	<del>Water in Petroleum Products and Bituminous Materials</del>
	<del>by Distillation</del>
<del>ASTM D 1665</del>	<del>Engler Specific Viscosity of Tar Products</del>

MATERIAL REQUIREMENTS

~~ASTM D 490 Tars (For Use in Road Construction)~~