

Initial and Preconstruction Report
Experimental Project
HOT-MIX COAL-TAR CONCRETE PAVEMENT
AND MULTIPLE, COAL-TAR SEALS ON SHOULDERS
APD 102 (64)
APD 102 (65)

Report No. 1

Prepared by
Robert L. Florence
Research Engineer

Division of Research
Kentucky Department of Highways

May 31, 1968

Project Description

It is proposed to construct an experimental section of roadway, 6.6 miles in length, using coal-tar concrete for base and surface, and to use multiple, coal-tar seals (3 seals) with coverstone on the shoulders. A section of pavement, 5.1 miles in length, incorporating the same structural thicknesses and types of courses but containing normal asphaltic binders, to be constructed on the same route will be designated for comparison and control purposes. The use of the coal-tar will be in compliance with Section 201(e) of the Appalachian Regional Development Act of 1965.

Project Location

A map showing the location of the project is attached.

Coal-Tar Section

The Hazard-Whitesburg Road (KY 15) from its junction with KY 7, near Jeff, in Perry County (approximate Sta. 298+50), extending easterly 6.6 miles to Sassafras in Knott County (approximate Sta. 648+00).

Control Section

The Hazard-Whitesburg Road (KY 15) from Red Fox, in Knott County (approximate Sta. 668+00), in Letcher County.

Note: There is a 6.3 mile section of KY 15 in Knott County, located between the experimental and control sections, which is to be constructed by the Corp of Engineers (Carr Creek Reservoir Area).

A. Nature and Objective of the Experiment

The principal objectives of this project are: 1) to compare the economics and performance of coal-tar and asphalt cement, 2) to further develop reliable coal-tar construction specifications (see the attached Special Provision for Hot-Mixed, Hot-Laid, Tar Concrete Base and Surface), 3) to familiarize State and contractor personnel with coal-tar construction, and 4) to implement the requirements of Section 201, Subsections d and e, of the Appalachian Regional Development Act of 1965.

Pavement design data and typical cross-sections are attached. These data include present and projected traffic, subgrade CBR, pavement course types, thickness of courses, types and grades of materials, and the various pavement cross-sections. A Special Provision--for the tar concrete construction is also attached. It is anticipated that no special construction equipment will be required on the experimental section.

The following general plan of study and evaluation is to be used. During construction the project will be inspected by Research Division personnel. Prior to construction of any bituminous surfacing, samples of materials to be used in the surfacing will be obtained for laboratory mix designs and testing. During construction of the bituminous surfacings, inspections will be made of the plant and paving operations and, samples of the mixtures will be obtained for laboratory evaluation. Density tests will be performed on the bituminous concrete courses with nuclear density equipment during construction, a report of the construction phase will be submitted.

Performance inspections will be conducted annually, until comparative performance of the test and control section has been established. These estimates of comparative performance will be based primarily upon visual observation. Condition reports will be prepared annually. When no further useful information is to be obtained from the experiment, a final report will be prepared summarizing the results of the study.

It is anticipated that the comparative construction costs will be established by the contract bid prices. However, it is recognized that the total costs could be influenced considerably after construction by differences in the maintenance required on the test and control sections. If significant differences in maintenance costs should develop during the term of the experiment, they will be reported.

B. Discussion

Under the Appalachian Regional Development Act of 1965, P.L. 89-4, Section 201, Subsection d, the states may give special preference to the

use of mineral resource materials indigenous to the Appalachian region in the Appalachian region in the construction of highways and roads authorized under this section. Under Subsection e of the Act, for the purposes of research and development in the use of coal and coal products in highway construction and maintenance, the Secretary (Secretary of Commerce) is authorized to require each participating State, to the maximum extent possible, to use coal derivatives in the construction of the roads authorized under this Act.

The Kentucky Department of Highways has demonstrated a interest in the development of road building materials from coal. A research project was conducted, beginning in 1959, which involved the development and evaluation of a coal-tar binder prepared from coal-tar, coal-tar oils, and powdered coal. To evaluate the binder, a total of 13 sections of pavement on 12 surfacing projects were selected and constructed throughout the State. These sections were constructed as a part of the normal asphaltic concrete paving contracts in which the coal-based coal-tar binder was substituted for asphalt cement in a length of each. Included in the experimental sections were resurfacing of asphaltic concrete sections and new construction over traffic-bound bases. Various laboratory and field tests were performed to support and supplement the evaluation of the performance of the coal-tar binder, based primarily on visual observation of the performance of the test sections. An investment of an amount approaching \$200,000 was made in the experimental features of this project by the Kentucky Department of Highways. After about two years of service under traffic, a report was prepared on the project and published in Highway Research Board Bulletin 350

(Symposium on Coal-Modified Tar Binder for Bituminous Concrete Pavements) and is listed as follows, "Experimental Paving Projects Using Curtis-Wright's Coal-Modified, Coal-Tar Binder". The other two papers in HRB Bulletin 350 discuss the development and comparative laboratory testing of the binder.

C. Estimated Construction Starting Date

It is planned to let the contract for the coal-tar section in June 1968. Inasmuch as the contract involves grade and drain construction, it is anticipated that the hot-mix surfacing will be constructed during the Summer of 1969.