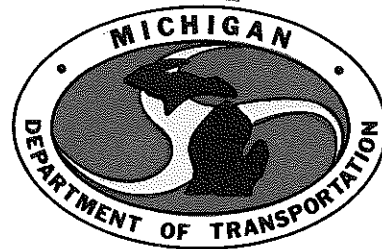


AIR QUALITY MEASUREMENTS OF
MOVABLE ASPHALT PLANTS FOR
RECYCLING PAVING ASPHALT

(Interim Report For 1981)



**TESTING AND RESEARCH DIVISION
RESEARCH LABORATORY SECTION**

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(Interim Report For 1981)

J. T. Ellis

Research Laboratory Section
Testing and Research Division
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Michigan Transportation Commission
Hannes Meyers, Jr., Chairman; Carl V. Pellonpaa,
Vice-Chairman; Weston E. Vivian, Rodger D. Young,
Lawrence C. Patrick, Jr., William C. Marshall
John P. Woodford, Director
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Summary

Stack samples were taken from two movable asphalt plants that were processing 50:50 recycled-to-virgin material. One plant used a baghouse filter exhaust system, the other used a wet scrubber system. It was found that the plant using the baghouse filter met Federal air quality standards for particulate emissions; the plant using the wet scrubber, however, did not. The need for modification of the wet scrubber systems is indicated.

Introduction

The stacks of two movable asphalt plants processing recycled asphalt pavement were sampled at construction sites during 1981. This work was performed at the request of R. A. Welke, Supervisor of the Testing Laboratory's Bituminous Unit. Both plants sampled were running 50 percent recycled pavement.

One of the plants tested used a baghouse filter exhaust system and was able to meet the Federal air quality standards for particulate emissions. The other plant tested used a wet scrubber system and failed to achieve the standards. Revamping of wet scrubber systems to improve emissions is indicated.

The sampling procedure used for both tests was the 'Sampling Train Type A - Wet Media' method described in Michigan Department of Natural Resources Air Quality Division "Guidelines for Source Testing of Particulates." The procedure is essentially EPA Method 5 except that the dry filter media holder is positioned between the third and fourth impinger and the particulate captured in the impinger water is dried and included as part of the total particulate capture. Standard EPA Method 5 includes only the capture on the dry filter medium and washings from the nozzle, probe, and associated glassware ahead of the filter. The Wet Media method usually produces slightly higher results than Standard EPA Method 5.

Project 1

Project 1 was the reconstruction of a section of I 94 from US 12 to Sawyer Rd (Construction Project IR 11015) near Sawyer. The contractor was the Reith-Riley Co. The plant was a Barber-Greene Co. drum mixer equipped with 'Dual-Zone Thermodrum' temperature control system and a baghouse filter collection system. The stack was rectangular, 75 by 28 in. and 35 ft high. Two complete samplings of the stack were accomplished on July 8, 1981. Stack velocity pressures varied from 0.6 to 3.0 in. of water

indicating a turbulent high-pressure stack. The plume appeared to be very clean with no indication of blue hydrocarbon smoke. The results are presented in Table 1.

Project 2

Project 2 was the reconstruction of a section of US 2 from M 117 to Milakokia Lake in Mackinac County (Construction Project M 49021). The contractor was Bacco Construction Co. of Iron Mountain. The plant was a CMI drum mixer with mid-drum feed and a wet scrubber filter exhaust system. The stack was rectangular, 32 by 28 in. and 24 ft high. One complete sampling run was accomplished on August 11, 1981. Stack velocity pressures varied from 0.8 to 2.0 in. of water indicating a fairly stable, but high-pressure stack. The plume appeared to be mostly water vapor with no indication of blue hydrocarbon smoke; however, visual examination of the probe during and after sampling showed a coating of fine soil particles. The particles were also profuse in the first impinger of the sampling train thus indicating that the plume was dirtier than it visually appeared. Another complete sampling run was accomplished on August 12, 1981. The plume was dark and had a bluish hydrocarbon color that was not apparent on the previous day. The presence of hydrocarbons was further indicated by a coating of a dark oily material on the probe and in the first impinger. The plant operator indicated he was running the mix at a higher temperature than on August 11 because of very wet aggregate. The results are presented in Table 1. The Federal emission standard is 0.04 gr/DSCF.*

TABLE 1
PARTICULATE CONCENTRATIONS
(50 Percent Recycled Material)

Project	Contractor	Location	Date	Particulate Concentration, gr/DSCF*	
1	Reith-Riley	Sawyer	July 8, 1981	0.017	0.028
2	Bacco	Gould City	August 11, 1981	0.22	
			August 12, 1981	0.20	

* grains per dry standard cubic foot.

The data in Table 1 show that the Project 1 plant easily achieved the Federal standards while the Project 2 plant failed to achieve the standards.

The Bacco plant in Project 2 used a two-pond system as a water supply to operate the scrubber. Both ponds were plastic lined. Water was pumped from Pond 1 to the scrubber which drained into a trench leading into Pond 2. Pond 2 overflowed into Pond 1 at the opposite end from the pump inlet. Fresh water was continuously being added to Pond 1 near the pump inlet. A drum of a coagulent or settling agent with a metering pump for dispensing was positioned alongside the return water trench draining into Pond 2. The water in Pond 1 near the pump inlet appeared dirty even with the precautions of using a two-pond system and a settling agent. Visual examination of a sample of the Pond 1 water in a glass beaker confirmed that the water near the inlet contained small soil particles. Thus it appears that soil particles already present in the scrubber supply water may have been a significant source of particulate emissions from the stack.

Conclusions

1) As shown previously in the 1980 report (MDOT Research Report R-1157), drum mix plants with baghouse filter exhaust systems continue to comply with Federal air quality standards for particulate emissions when processing recycled paving asphalt.

2) Drum mix plants with wet scrubber exhaust systems have not yet shown they can achieve Federal air quality standards for particulate emissions when processing recycled paving asphalt. As suggested in the 1980 progress report, these plants could likely reduce their emissions by using clean water to operate their scrubbers and by lowering stack velocity pressures. Cleaner water could be obtained by using a continuous clean water supply or a filtered water supply system. Replacement of wet scrubber systems with baghouse filter systems should be considered for plants processing recycled paving asphalt.

Additional tests of plants processing recycled asphalt paving are planned for 1982 and succeeding years. The number of tests performed will depend on construction schedules.