

AP-42 Study Sponsored by the

RMC Research Foundation

Executive Summary

1.1 Purpose and Scope

The Ready Mixed Concrete Research Foundation (RMC Research Foundation) sponsored the emission factor test program for ready mixed concrete facilities using plants located in North Carolina, Virginia, and South Carolina. The purpose of this project is to prepare an updated and expanded set of AP42, Chapter 11.12 emission factors for total particulate matter, PM₁₀, PM_{10-2.5}, and PM_{2.5} from truck mix and central mix process operations at ready mixed concrete plants.

The 1995 edition of AP42 Section 11.12¹ has total particulate and PM₁₀ emission factors based on only one central mix plant and two truck mix plants. These EPA emission factors were based, in part, on subjective visible emission observations, and the measured data had considerable catter. EPA rated the factors as D for truck mix operations and E for central mix operations.

The 1995 edition of AP42 Section 11.12 does not have any emission factor data applicable to PM_{10-2.5} and PM_{2.5}. Information concerning these two forms of particulate matter is needed by the Ready Mixed Concrete Industry and regulatory agencies due to the anticipated promulgation of new nationwide ambient air quality standards applicable to these two forms of particulate matter.

Three truck mix operations and three central mix operations are included in the scope of this test program. This test report presents the results of December 2003, February 2004, and May 2004 emission factor testing at the (1) Ready Mixed Concrete Company, Inc. (RMCC) truck mix and central mix operations at the Wake Forest, North Carolina plant, (2) the S.T. Wooten central mix plant in Raleigh, North Carolina, (3) the Chandler

¹ The January 1995 edition of AP42, Section 11.12 contains the presently applicable emission factors for Ready Mixed Concrete Industry sources.

Concrete truck mix plant in Troutville, Virginia, (4) the Concrete Supply truck mix plant in Rock Hill, South Carolina, and (5) the RMC Carolina Materials central mix plant in Raleigh, North Carolina.

The criteria used by the RMC Research Foundation in choosing the plants to be tested included (1) the availability of process equipment representative of the U.S. Ready Mixed Concrete Industry, (2) facility locations within 200 miles of Raleigh, North Carolina to minimize travel related costs, and (3) sufficient anticipated plant throughput at the time of the test program. All of these plants have fugitive dust capture systems and fabric filters. The RMC Research Foundation and Air Control Techniques, P.C. believe that these plant sites are representative of most plants in the U.S. based on the following facts: (1) ready mixed processes are highly uniform from region-to-region in the U.S. due to state DOT and other customer product specifications, (2) processing equipment manufactured for ready mixed plants is highly consistent throughout the U.S., and (3) the types of control systems are very similar throughout the U.S.

1.2 Emission Factor Test Results

The results of the RMC Research Foundation emission factor test program indicate that the hood capture efficiencies at Ready Mixed Concrete plants are substantially higher than those specified in the 1995 edition of AP42 Section 11.12. Truck mix operations demonstrated hood capture efficiencies ranging from 93% to 99.5%, well above the 71% value published in AP42. Central mix operations demonstrated hood capture efficiencies ranging from 97.2% to 99.3%, well above the 94% value published in AP42.

The total particulate matter and PM₁₀ particulate matter emissions measured in this RMC Research Foundation study are substantially below the emissions reported in the 1995 edition of AP42 Section 11.12. The RMC Research Foundation study emissions for central mix operations are below those of truck mix operations; however, the differences are considerably smaller than suggested by the 1995 AP42 emission factors. The RMC Research Foundation and 1995 EPA emission factors are summarized in Figure 1-1.

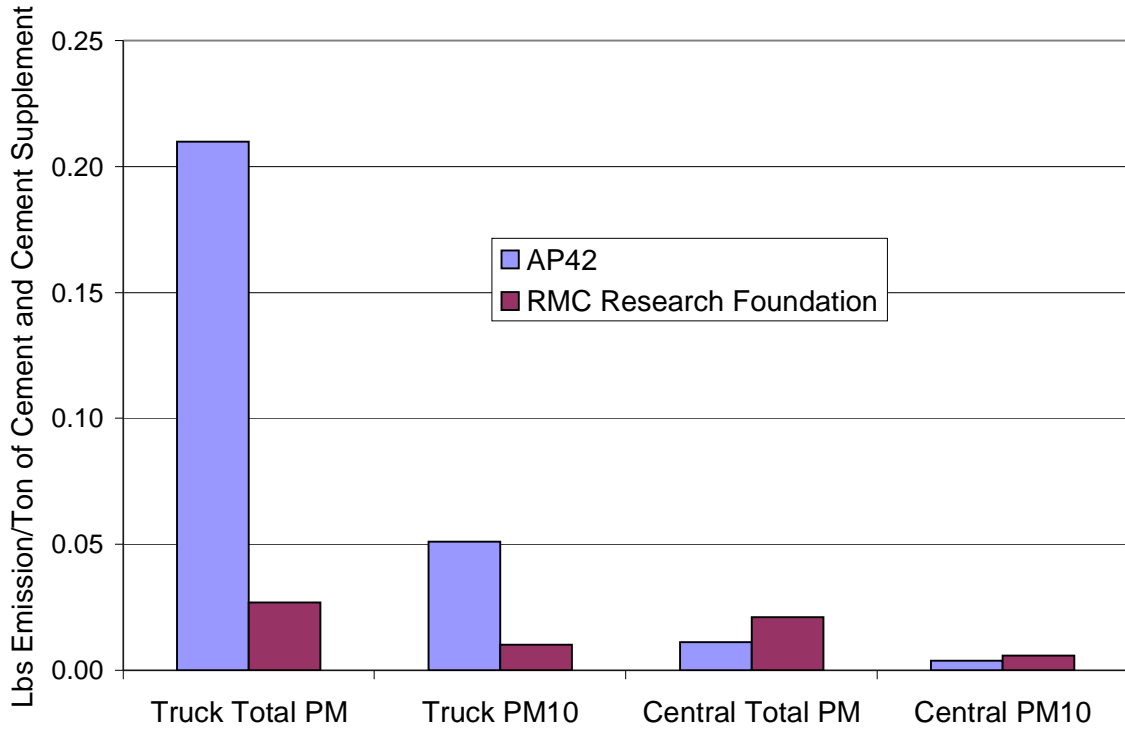


Figure 1-1. Comparison of AP42 and RMC Research Foundation Controlled Emission Factors

The results of the controlled² emission factor tests are summarized in Table 1-1 for the truck mix sources and Table 1-2 for the central mix sources. The RMC Research Foundation emission factors for filterable particulate matter and PM₁₀ particulate matter are compared with previously published AP42 emission factors (controlled conditions). No emission factors were previously available for PM_{10-2.5} (termed “coarse particulate matter”) and PM_{2.5} (termed “fine particulate matter”).

² Controlled emissions are the total of emissions from the fabric filter used to control the mixing operation plus the fugitive emissions not captured by the hood.