PROJECT NUMBER
04101

PROJECT TITLE
Minimizing Emissions from Highway Construction

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PROJECT OBJECTIVE
This project will provide transportation and environmental agencies with more-appropriate methodologies to estimate particulate matter and NOx emissions from off-road, diesel vehicles used in construction. On-site measurements will be used in conjunction with the NONROAD and OFFROAD models to obtain more appropriate emission inventories from road construction sites in the Southeastern U.S.

PROJECT ABSTRACT
Fine particulate matter (PM2.5) and NOx are major public health and regulatory concerns. As PM2.5 non-attainment areas are designated in Alabama and as Alabama’s State Implementation Plan for NOx is implemented, transportation-associated emissions will pose major regulatory and economic challenges to the transportation sector. Heavy duty diesel vehicles used in road construction are major sources of PM and NOx emissions. The Environmental Protection Agency has developed regulatory programs to ensure massive reductions in emissions from these sources. However, accurate estimations of PM and NOx emissions from real-world sites at typical operating conditions found in Alabama are simply not available.

This multi-faceted data collection, modeling, and interview based project was proposed to address the problem. PM2.5 emissions will be measured from construction sites by placing monitors both up and down wind and monitoring site activities. NOx emissions will be determined using correlations based on measured PM2.5 emissions. The NONROAD and
OFFROAD emission models will be modified to reflect actual conditions observed in Alabama. Construction companies operating in cities that are already controlling PM and NOx off-road releases (Atlanta and Houston) will be interviewed to determine the most economical and most efficient way to address these regulatory concerns.

TASK DESCRIPTIONS

Task 1: Review of Literature and Practice   A literature review will be conducted and discussions will be held with construction agencies and companies with emission control experience.

Task 2: Preliminary Emissions Measurement Methodologies   The general measurement methodologies will be refined by conducting measurements at UA construction sites.

Task 3: Site Selection   Representative construction projects adjacent to existing roads will be selected as test sites.

Task: 4 Data Collection   PM2.5 and hydrocarbon data will be acquired and local weather data will be collected.

Step 5 Model Comparison   The NONROAD and OFFROAD models will be used to determine if locally relevant data produces more accurate emissions estimates than generic parameters.

MILESTONES AND COMPLETION DATES
Task 1: Jan-Feb 2004
Task 2: Feb-Mar
Task 3: Jan-Mar
Task 4: Apr-Sep
Task 5: Aug-Sep

BUDGET
This is a one-year project; UTCA funds $41,996; total funds $84,019.

STUDENT INVOLVEMENT
Two undergraduate students will be supported by this research. Their duties will largely involve sampling activities.

RELATIONSHIP TO OTHER RESEARCH PROJECTS:
This research is a natural continuation of the investigators’ previous work: Drs. Williamson and Jones jointly conducted UTCA project 03105 - “PM2.5 Emissions from Birmingham Roads.” Dr. Williamson has conducted UTCA projects 00108 - “Air Quality Aspects of Traffic Management,” 00466 - “Data for MOBILE-6 Air Quality Conformity,” and 02109 - “Monitoring Ozone Migration in Alabama.” Dr. Jones has conducted UTCA project 03412 - “Air Quality Aspects of Traffic Management.

TECHNOLOGY TRANSFER
The results will be: (1) submitted to peer-reviewed journals and regional/national conferences, (2) shared with the Alabama Department of Transportation, Alabama Department of Environmental Management, Birmingham Regional Planning Commission and Jefferson County Department of Health, and (3) used as “seed” to develop additional funding sources.

POTENTIAL BENEFITS OF THE PROJECT
The major benefit will be the development guidance to support cost-effective minimization of emissions from highway construction projects. Additionally, this project will foster the cross-university development of two young faculty members in the transportation air quality field.

TRB KEYWORDS:
Transportation Planning, Air Quality, Vehicle Emissions, Construction Air Quality