EXECUTIVE DIGEST

MATERIALS AND TECHNOLOGY DIVISION

INTRODUCTION

This report contains the results of our performance audit of the Materials and Technology Division, Bureau of Highways (BOH), Michigan Department of Transportation (MDOT), for the period October 1, 1992 through December 31, 1995.

AUDIT PURPOSE

This performance audit was conducted as part of the constitutional responsibility of the Office of the Auditor General. Performance audits are conducted on a priority basis related to the potential for improving effectiveness* and efficiency*.

BACKGROUND

MDOT was organized under Sections 16.450 - 16.458 of the *Michigan Compiled Laws* (Sections 350 - 358, Act 380, P.A. 1965). MDOT was established to provide the people of Michigan with a safe, efficient, and environmentally sound total transportation system in the most cost-effective manner.

At the time of our audit, the Materials and Technology Division was one of three divisions within the BOH Office of Highway Operation. BOH was reorganized on April 7, 1996

and split into the Bureau of Highway Technical Services and the Bureau of Highway Operations. The Materials and Technology Division is organizationally located within the Bureau of Highway Technical Services.

The Division is responsible for quality assurance and improvement in the design, construction, and maintenance of transportation facilities/projects. This responsibility is fulfilled by developing and publishing highway construction specifications, sampling and testing materials, conducting a varied program of technical investigations and research services, and providing Statewide consulting services. The Division is organized into three sections: Research and Technology, Geotechnical and Geoenvironmental, and Materials Testing.

Division expenditures totaled approximately $11.7 million for the fiscal year ended September 30, 1995. As of December 31, 1995, the Division had 141 full-time employees. Sixty district employees perform similar quality assurance functions. These employees advise project engineers and report to district engineers. The day-to-day affairs of transportation facility construction projects are managed by project engineers who report to BOH district field engineers. BOH developed the project engineer certification process* to help ensure that project engineers are properly performing their duties.

AUDIT OBJECTIVES, CONCLUSIONS, AND NOTEWORTHY ACCOMPLISHMENTS

Audit Objective: To assess the effectiveness of the Division's policies and procedures in ensuring that the Division tests materials used in transportation construction projects in accordance with industry standards and/or MDOT

specifications and to assess the adequacy of the BOH internal control structure* applicable to BOH's quality assurance responsibilities.

Conclusion: We concluded that the Division's policies and procedures were generally effective in ensuring that materials used in transportation construction projects were adequately tested and met industry standards and/or MDOT contract specifications. We also concluded that the BOH internal control structure did not ensure that applicable policies, procedures, and required methods were used to meet BOH's quality assurance responsibilities. We noted two conditions that we considered to be material (i.e., material conditions*):

- The Construction Division project management operating procedures and controls seriously impacted the effectiveness of BOH's quality assurance procedures and controls to ensure that contractors followed construction procedures and contract specifications (Finding 1).

  MDOT concurred with the recommendation related to this finding and has indicated that the revised operating procedures will require complete documentation of project decisions rendered.

- BOH had not developed procedures for the project engineer certification process to standardize the approach, include methods to analyze and interpret test results and construction decisions made, and clarify

under what circumstances conditional pass ratings may be given (Finding 2).

MDOT concurred with the recommendations related to this finding and has appointed a process improvement team to revise the project engineer certification process.

Noteworthy Accomplishments: The Division's Concrete Laboratory and Metals and Aggregate Laboratory maintained their American Association of State Highway and Transportation Officials (AASHTO) accreditation during our audit period. In addition, the Concrete Laboratory was recognized in June 1995 by the National Institute Standards Technology - Cement and Concrete Reference Laboratory (NIST) for being 1 of only 29 laboratories to successfully participate in each NIST inspection dating back to 1929.

Audit Objective: To assess the effectiveness of the Division's efforts to identify, test, and approve new materials, devices, procedures, and research projects undertaken for their potential to be used in Michigan transportation construction projects.

Conclusion: We concluded that the Division effectively identified, tested, and approved new materials, devices, procedures, and research projects. However, we noted a reportable condition* involving equipment cost capitalization (Finding 3).

Audit Objective: To assess the adequacy of the internal control structure applicable to the Division's responsibilities.

Conclusion: We concluded that the Division's internal control structure did ensure that applicable policies, procedures, and required methods were used to meet the Division's responsibilities. However, we noted a reportable condition involving the monitoring of laboratory activities (Finding 4).

AUDIT SCOPE AND METHODOLOGY

Our audit scope was to examine the program and other records of the Materials and Technology Division for the period October 1, 1992 through December 31, 1995. Our audit was conducted in accordance with *Government Auditing Standards* issued by the Comptroller General of the United States and, accordingly, included such tests of the records and such other auditing procedures as we considered necessary in the circumstances.

Our audit methodology concentrated on reviewing processes, programs, and documents developed as a result of materials testing and project research. We visited seven districts to review interim and local projects and to discuss discrepancies noted within our review of project documentation maintained by the Division.

We reviewed BOH manuals used during construction activities to understand material use, placement techniques, and testing procedures. We selected a random sample of significant pay items to analyze contractor compliance with contract specifications. We also reviewed the process used to certify project engineers.

We reviewed the Materials Sampling Guide and selected a random sample of approved manufacturers, approved distributors, and tested stock suppliers to ensure that materials were tested or certified with a quality control plan. We also selected a random sample of research projects undertaken by the Division to ensure compliance with the Work Request Screening Procedure Guideline.

We identified, reviewed, and analyzed various duties of the Division to assess potential risk in materials testing and other activities performed by the Division.

AGENCY RESPONSES AND PRIOR AUDIT FOLLOW-UP

Our audit report includes 4 findings and 6 recommendations. The Department concurred with our findings and is in the process of implementing the recommendations.

The Division had complied with 7 of 10 prior audit recommendations. The other 3 recommendations were rewritten in this report.