SUMMARY
Currently, most material test results at NJDOT are applied on a micro scale and paper-filed. To integrate the operational functionality of material data filing, processing, and transfer, a computerized local/remote Intranet network management system was developed. The NJDOT LIMS (Laboratory Information Management System) is an integrated material laboratory testing result report system. A pilot scale intranet-based information management system was developed, installed, tested, and is currently being evaluated by NJDOT. This system consists of three major components: (a) database; (b) administrative management interface; and (c) database-driven web application. These three parts comprise an Intranet web application with which users can create reports, store testing results, and retrieve, display, and transfer information among the NJDOT Materials Bureau in Trenton and regional and field offices through the NJDOT network. LIMS standardizes data entry procedures, defines performance evaluation measures, certifies material test data, analyzes the relationships between test data and actual material performance, streamlines the project closeout process, and generates summary reports. The LIMS System is an efficient, effective, and user-friendly one.

SQL Database
The SQL database provides all administrative information about projects, contractors, suppliers, material mix designs, personnel, laboratories, and field offices. The system administrator of NJDOT LIMS uses the Administrative Management Interface to input all administrative information. The Administrative Management Interface is an Microsoft Access 2000 application, named 'Lims_2000_Admin.mdb'. This application has functional data entry/retrieval forms linked to the SQL database. Using these forms at the supervisor level, the system administrator can initialize specific records on projects, contractors, and suppliers; enter material mix design data; and enter User ID for authorized users. The SQL database also stores test results for concrete, soils, and asphalt samples.

Administrative Management Interface
The Main Menu of the Administrative Management Interface provides access to the administrative program functions that allow updating of system information. Figure 1 shows this main menu. Clicking on any of the option buttons will take the user to the corresponding function.
LIMS Intranet Application

By LIMS design, the data entry can be done manually (basic information initialization), automatically (calculated and transferred results), or be triggered (data downloading) by another device. Each sampling process has its own logical life from beginning to end. All data entry forms in LIMS were created according to their sampling logic, and data fields and form layout were standardized. Figure 2 shows a sample web page of the LB201-CY General Information form for concrete cylinder material. Figure 3 shows the related Trenton Central Lab test data form, and Figure 4 displays a sample of the LB201-CY Full Report.
Figure 3. LB201-CY Trenton Lab Form

Figure 4. LB201-CY Full Report
It is the integrated design of the sampling cycles that makes LIMS a flexible and reliable information management system. The pilot scale LIMS currently contains all the forms for three major construction materials (concrete, soil, and asphalt concrete) plus the closeout forms required by FHWA.

All of the required forms for the purpose of closeout have been incorporated into the LIMS System. This feature will help users to process closeouts of projects effectively and efficiently. Figure 5 shows a close out form (Form LB96) that is used to prepare a computer generated closeout letter sent to FHWA. Figure 6 shows an Exceptions of Failures Report which is attached to the closeout letter to FHWA.

![Figure 5. LB96 Close-out Form](image-url)
WHAT ARE THE BENEFITS OF LIMS?

LIMS can significantly reduce paper-work and provides the capability to store relevant materials data and retrieve it rapidly. It also shortens the time between project completion and final closeout as mandated by the Federal Highway Administration for federally funded projects. LIMS and its concept have a great potential to be adopted by other transportation agencies for management of materials and laboratory test data.

A final report is available online at: http://www.state.nj.us/transportation/refdata/research/

If you would like a copy of the full report, please FAX the NJDOT, Bureau of Research, Technology Transfer Group at (609) 530-3722 or send an email to Research.Bureau@dot.state.nj.us and ask for:

Laboratory Information Management System (LIMS)

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