INTRODUCTION

The Louisiana Department of Transportation and Development (DOTD) has collected information on scour around bridges for years; but compiling, referencing, and maintaining the information has long been a daunting task. Scour information, in the form of fathometer logs, has been collected by DOTD since the 1970’s. A tremendous amount of scour data for 120 bridges throughout Louisiana already exists in traditional paper files. Manual and visual analysis of the data by location and survey section, hydraulics section, district offices, and contract companies has consequently been tedious work. The department was sorely in need of a better method to access the data in an efficient, modern way.

OBJECTIVE

The objectives of the project were to:
• Develop a database with manipulation capabilities such as data retrieval, visualization, and update;
• Input the existing scour data from DOTD files into the database

RESEARCH APPROACH

DOTD has long recognized the need for ready-to-use computer software using modern database technology to perform scour data management. In an effort to address that need, LTRC researchers have recently developed a new computer program that compiles scour information in an easily accessible, convenient database. The system stores scour data in a Microsoft Access™ database program. A Visual BASIC™ computer program is used as a front end to allow the user to access the database. The bridge scour program automates data retrieval, visualization, update, additions, and deletions.

Scour data for a specific bridge can be searched and retrieved using one or a combination of indices such as bridge number, state project number, recall number, district code, parish code, river, and route. The database software tabulates the basic bridge information, pier data, and hydrographic data of the cross-sections and longitudinal sections at a specific location and time.

The program also provides survey plans of the bridges. The plans show locations of bridges, pier distances, base line stations of the hydrographic readings, and the locations of the monitored cross-sections along the river. In addition to the survey information, the program displays soil-boring data near the pier locations. Plots of the cross-sections, longitudinal sections, and contours are displayed for the selected locations and survey dates. Contour plots can also be exported for use in other graphical programs. The history of scour at a specific location is plotted in hydrographic-time plots.
The scour software allows for new scour data to be added to the existing bridge data and for the entry of data on new bridges. Bridge and scour data can also be modified or deleted from the database. These operations are accessible to DOTD personnel with an authorized password.

As part of the new software package, researchers have also developed a manual that explains in detail the capabilities and applications of the database management software developed at LTRC for storage and retrieval of scour data on the Louisiana highway bridges.

CONCLUSIONS

The new program provided a categorical, systematic approach for accessing existing information and inputting new information for each of the scour monitored bridges. The new software significantly reduced the time spent on data retrieval and bridge scour analysis. It eliminated the need for maintaining large paper copy files and improved the efficiency of reproducing and distributing the results to the districts. By providing easy access of data through networking, district maintenance engineers can easily monitor changing conditions and provide timely assessments of scour critical bridges.

IMPLEMENTATION

LTRC researcher with the help of LSU student workers entered the historical data for the existing 120 monitored bridges. This task was completed in October 2000.

Location and survey personnel are responsible for maintaining and updating the data as new information is obtained. Hydraulic personnel are responsible for the input of new bridges and bridge information as well as for the overall distribution of the program and control of password access codes. Password access is only required for data entry and file manipulation. Open access is allowed for data retrieval, plotting, and exporting.

DOTD personnel having access to the design server are able to utilize the attributes of the program. This server is presently accessible throughout the headquarters office and the majority of the district main offices.

Future implementation of the program will include networking the database for users access through the DOTD intranet. Further plans will focus on networking the database into the DOTD GIS strategy and allowing a more global access to the program throughout DOTD.

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