

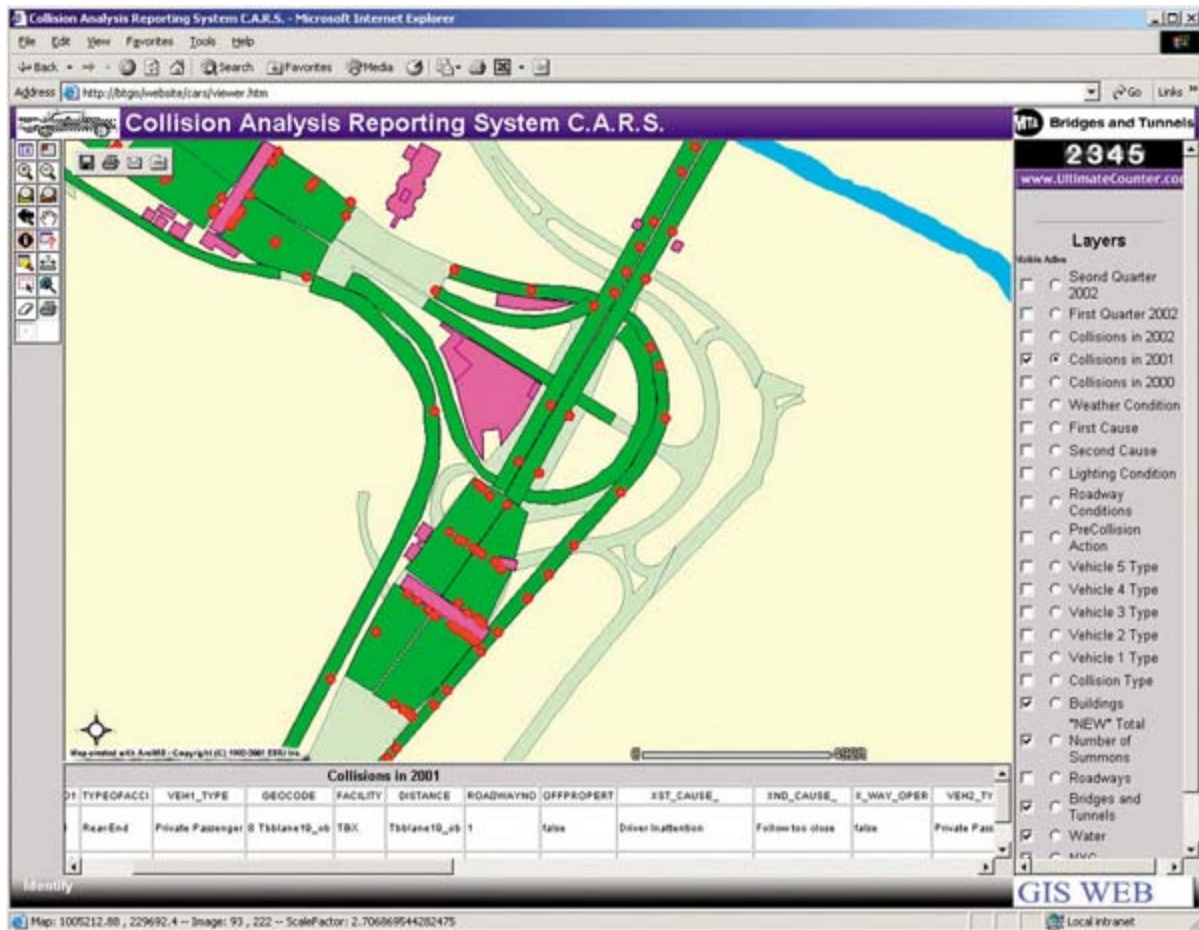
Making New York City's Roads Safer With GIS

Nation's Largest Bridge and Tunnel Toll Authority Creates Advanced Solution for Reducing Accidents

In terms of traffic volume, the New York Metropolitan Transportation Authority (MTA) Bridges and Tunnels (B&T) organization is the largest among the nation's bridge and tunnel toll authorities. Also known as the Triborough Bridge and Tunnel Authority (TBTA), it serves more than one million people daily in the New York metropolitan area. As a constituent agency of the MTA, its dual role is to operate seven bridges and two tunnels as well as to provide surplus toll revenues to help support public transit. Its facilities include the Triborough Bridge, Throgs Neck Bridge, Verrazano Narrows Bridge, Bronx–Whitestone Bridge, Henry Hudson Bridge, Marine Parkway, Gil Hodges Memorial Bridge, Cross Bay Veterans Memorial Bridge, Brooklyn Battery Tunnel, and Queens Midtown Tunnel.

More than 750,000 vehicles use these facilities each day. Ensuring optimized traffic flow is a mandate MTA B&T works at continuously, both in terms of day-to-day infrastructure maintenance and support and long-term planning and proactive problem solving. And one of the most advanced tools MTA B&T uses is GIS. The organization recently developed an advanced solution for analyzing traffic collision data and a host of other data sets to find new solutions to avoid potential traffic hazards. Developed by MTA B&T using ESRI's ArcIMS and ArcView 8 software, the Collision Analysis Reporting System (CARS) is the flagship GIS application developed by MTA B&T.

Donald Raimondi, budget and research analyst, MTA B&T, and manager of the project, and Greg Kurilla, GIS specialist at MTA B&T, developed CARS to provide managers with the tools to detect significant histories quickly and accurately and learn from them to make safer roadways.



The Collision Analysis Reporting System (CARS) is the flagship GIS application developed by MTA B&T. This shows the number of rear-end collisions in 2001 within a focused area.

One key variable—location—could not be accurately described in the past. To address this in CARS, specific locations are developed using ArcGIS technology in a manner meaningful to and comfortable for operations managers. This is coordinated with the data on motor vehicle accident reports (required by the state) so that the information is easily, accurately, and quickly transferred to the newly developed collision mapping and database system. This new system of reporting improved the time for management to analyze, review, and monitor collisions. The prior system was more cumbersome in identifying significant variables.

MTA B&T implemented the system to facilitate sophisticated analyses to identify locations, causes, and collision trends on a microlevel, and thus point the way to strategies and solutions for future reduction in collisions. Timely and complete analysis is essential to achieve results.

Large Capital Program With Advance Planning

Because MTA B&T is currently undergoing its largest capital program ever, advance planning for maintenance and control of traffic seeks to minimize delays.

“For many years, collisions were the focus of MTA B&T’s safety initiatives; in 1998 through the present, they became a key agency goal,” says Raimondi. “The collision reduction program is premised on the belief that by microinvestigative analysis of each collision, and then finding common causative variables, such as location, time of day, road conditions, driver behavior, physical conditions, etc., that strategies can be developed to reduce the incidence of future collisions.

“The system we developed was designed for and with input and feedback from its major customers—the Operations, Engineering and Construction, and Health and Safety Departments,” says Raimondi. “To further increase its usefulness, it has been deployed on the agency’s internal Web for ease and timeliness of access by all involved in the collision reduction program.”

Reducing Traffic Collisions: Applying CARS to the ACROBAT Program

The goal was to reduce vehicular collisions by 10 percent from the previous year using CARS to assist the Achieving Collision Reduction on Bridges and Tunnels (ACROBAT) program. CARS uses the geocode addressing feature in ArcView to plot the collisions on the map.

“We designed a street naming convention (zones) for all our facility locations,” says Kurilla. “Each zone has the lamppost marker numbers similar to addresses on a street. Therefore, if we have a collision at the ‘on-bound ramp to the bridge lamppost 1-10 (street) at lamppost 5 (address),’ the geocode addressing feature knows that lamppost 5 lies between 1 and 10 plotting the collision at the center of the line.”

MTA B&T then can attribute all the collision information to the map that includes weather, time, date, day, roadway conditions, roadway character, lighting conditions, injuries, collisions in construction zones, fatalities, collision type, causes, preaccident actions, and vehicle types. The organization can then use symbols to decipher the different information on the map. An example is looking at all the collisions on the facility and highlighting only collisions in construction zones.”

CARS has helped the agency achieve collision reductions. The success of this project is due to the creation of a system that is powerful, is easy to use, and generates information not previously

available. This enables responsible managers to dedicate their efforts to crafting meaningful strategies, coupling this information with their expertise and industry experience to reduce collisions.

In April 2000 a centralized database was established to record all collision information from motor vehicle accident reports in real time that analyzes trends from a historical database. The database then attributes and plots this information to a specific location on a map via ArcGIS. Using this technology, maps were created of facilities from the New York City basemap and existing CAD drawings. ArcIMS allows management to view the accident data live via the Web versus getting monthly, static maps.

GIS technology improves the accuracy and detail of collision information that can be seen on a map of the city's facilities. This enables nontechnical staff to visually see trends and analyze collisions via a user-friendly Web-based system. Staff can then recommend, develop, and implement remedial measures to enhance safety at the city's facilities. Key accomplishments include reduced time to identify areas and analyze collisions, reduced collisions by zoning and sectoring facilities for analysis, improved data entry, and more data for better analysis.

For more information, contact Donald Raimondi, MTA B&T budget and research analyst (e-mail: <mailto:DRaimond@mtabt.org>), or Ernie Ott, ESRI transportation industry solutions manager (tel.: 909-793-2853, ext. 1-1984; e-mail: <mailto:eott@esri.com>).