

REMSOFT

CASE STUDY

Remsoft Software Sustainably
Managing Transportation
Assets*Proves funding
needs while predicting usage
decades into future*

CASE STUDY HIGHLIGHTS



- **Transparent defensible management plans**
- **Performance based, least life-cycle cost strategic planning**
- **Trade off between different asset types**

THE CHALLENGE

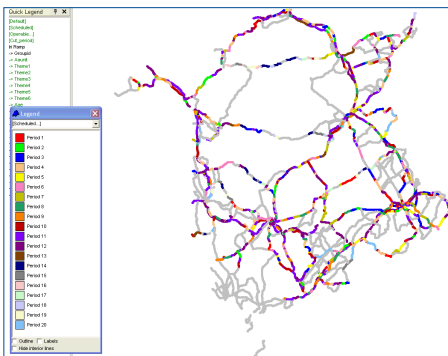
Since 2006, the New Brunswick Department of Transportation (NBDoT) has managed a capital highway and bridge construction program of approximately \$236 million maintaining an extensive highway network that includes 18,000 kilometers of roads, 2,900 bridges and various ferry crossings. In part, its mission has been to provide for, maintain and manage a safe, reliable highway network while promoting an efficient multi-modal transportation system. In recent years the NBDoT completely changed the way it manages its resources, and, in doing so, established itself as a model to transportation authorities around the globe.

In 2002, the NBDoT—challenged to repair and maintain a deteriorating infrastructure despite a funding deficit—launched an effort to find a new solution. The goal was to develop a plan for managing New Brunswick's nearly 200-year-old infrastructure using investment-minded thinking for a cost-effective, sustainable asset management approach. By April 2005, the now award-winning, innovative solution called Asset Management Business Framework (AMBF) was in its implementation phase. At its core was an advanced analytics software package by Remsoft (the Remsoft System).

As those in the transportation industry know, the cost of maintaining transportation assets usually exceeds availability of funds, resulting in infrastructure debt that worsens as the inventory of assets grows with expansion and new construction. At the same time, inefficient decisions are made based on a lack of useful information.

Transportation and civil infrastructure experts also are familiar with the management practice commonly known as “fix the worst first.” It is a practice born out of necessity in a sector faced with aging assets, insufficient funds and complex, competing priorities. Together with life cycles that can stretch hundreds of years, these factors turn informed decision making and effective resource allocation into daunting challenges.

Consider the complexities of monitoring deterioration of roads, bridges, and related assets. Then factor increased usage due to expanding populations and heavier traffic volumes. Consider the boom and bust cycles that result in periods of significant expansions followed by periods of maintenance. Bear in mind adjacency issues—the proximity of pavements, culverts, sewers, curbs, sidewalks, pipes and signs. Without a way to determine how addressing one asset impacts the lifecycle of others, the task of maintaining all of them becomes a guessing game. In an area the size of New Brunswick with as many transportation assets that it has, the number of alternative choices for action over time can be truly mind boggling.



*60 percent increase
to the 2008 budget
while other departments'
budgets decreased*

THE REMSOFT SOLUTION

NBDoT executives chose the Remsoft System for its analytic modeling and optimization capabilities. With its ability to consider millions of alternatives and constraints simultaneously, the Remsoft System was the perfect solution for the task of managing New Brunswick's infrastructure. While NBDoT previously used models that allowed them to model individual assets such as a single bridge, the relatively static programs were limited in their management capabilities. None allowed NBDoT to perform advanced analytics and what-if scenarios and test trade offs among multiple assets. The Remsoft System did.

Ugo Feunekes, Remsoft's co-founder and chief technology officer, worked with Fredericton-based IT provider xwave to oversee the System implementation. Feunekes explained that the initial problem was to determine how bridges, roads and ferries could be managed simultaneously.

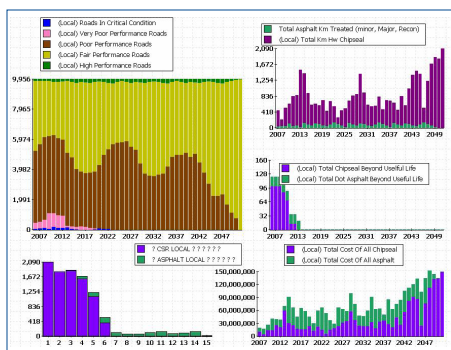
"The trade off between the different asset classes is something that hadn't been done very often," Feunekes said. "Also, they (NBDoT) were looking for a quantitative way to calculate the cost of maintaining the existing infrastructure."

The Remsoft team used mathematical optimization as the key component to New Brunswick's AMBF to plan the long-term treatment of roads, bridges and ferries.

Mathematical optimization techniques are used extensively in almost all areas of decision making to solve very complex problems and create balance among conflicting constraints. Mathematical optimization has been used for several years in the field of forest management to determine appropriate harvesting, planting and treatment relative to the life spans of trees. Thus, just as the forest industry optimizes decisions relative to the sustainable management and growth of forests, the NBDoT applied the Remsoft System to optimize management of the deterioration and maintenance of its infrastructure assets.

The Remsoft System implementation was completed very quickly and involved one three-day training course for those from the xwave team, plus data collection. The Remsoft System runs on standard PC platforms, so the NBDoT did not have to upgrade its existing computer systems to implement the program. However, the department has plans to upgrade to a computer with more random access memory (RAM) in order to create even larger models. The size of NBDoT's models is a function of the detail and number of assets they add. As they add more and more assets, the models increase in size and complexity, meaning the computer in which they generate their models needs more memory.

In 2007, the NBDoT completed implementation of its AMBF across New Brunswick with a focus on highway and structure assets. By 2008, it will use the implementation for all transportation and asset planning for safety and mobility measures incorporating buildings, lighting, signs and other highways accouterments.



THE RESULTS

With AMBF, the NBDOT put in place a long-term view of the resources required to sustain the condition of New Brunswick's transportation network within performance standards and at significant savings.

Because the software core of the AMBF uses mathematical optimization and advanced analytics capabilities, the NBDOT now has the ability to understand short and long-term consequences of investment and treatment alternatives and has a mechanism to visualize the decision results by conducting "what if" scenarios as they relate to overall asset condition, performance and operational measures.

Graphics and map displays of model results have made it easy for all levels of NBDOT management to understand what the models are conveying.

The overall result of the project has been the establishment of a framework and business processes that allow the NBDOT to make better financial decisions by moving toward a performance based, least life-cycle cost, asset-centric approach to long-term strategic planning. Most importantly, the Remsoft Systems made it easy for NBDOT to communicate the effects of trade offs, that is the impact of spending less money and what happens to the condition of roads and bridges over time.

NBDOT realized early on that money spent on maintenance could be spent more efficiently, that NBDOT could spend significantly less and maintain the same level of asset quality by simply planning better. However, an even more significant benefit to having the Remsoft System in place was that the NBDOT had a method to demonstrate that they had been under funded for years and that roads and bridges needed more funding immediately. Graphs, charts and maps generated by the Remsoft System showed what was going to happen over the next 20 years unless more money was spent. As a result, the NBDOT received an approximately 60 percent increase to its 2008 budget while other departments' budgets decreased.