

## Integrated Roadway Asset Management System



GIS-based Asset Management System



Optimize Maintenance



Manage Signs



Analyze Safety

*Roadsoft* is a roadway management system for collecting, storing, and analyzing data associated with transportation assets. Built on an optimum combination of database engine and GIS mapping tools, *Roadsoft* provides a quick, smooth user experience and almost unlimited data-handling capabilities.

*Roadsoft* was developed and is supported by the Center for Technology & Training, which is part of the Department of Civil & Environmental Engineering at Michigan Technological University.

### Types of Data

*Roadsoft* manages a variety of data associated with transportation systems. Specific types of data include:

- ◆ Roads
- ◆ Bridges
- ◆ Signs
- ◆ Culverts
- ◆ Driveways
- ◆ Guardrails
- ◆ Intersections
- ◆ Pavement Markings
- ◆ Sidewalks
- ◆ Traffic Counts
- ◆ Vehicle Crashes

### Features

**GIS-Based Map Interface** provides a clear visual representation of the roadway assets in the database. Using map layers, you can easily display or hide specific types of data and you can adjust colors, sizes, and shapes to customize the view.

**Mobile Data Collection** using a GPS connected to the Laptop Data Collector utility is a convenient way to collect and maintain accurate data for the system.

**Inventory of Assets** includes detailed data for pavements, signs, and other roadway assets in your jurisdiction.

**Asset Management Analysis Tools** enable you to create and implement efficient and effective construction and maintenance strategies to maximize the return on your transportation investment.

**Data Mining and Report Generation Capabilities** provide summaries of specific data in the database, and enhance understanding for yourself and between you and the other transportation stakeholders in your jurisdiction.

### Getting Started

*Roadsoft* software, technical support and training is available to agencies worldwide under license agreement. For more information, visit our website on [Getting Started](#) for agencies outside of Michigan, or call 906-487-2102.



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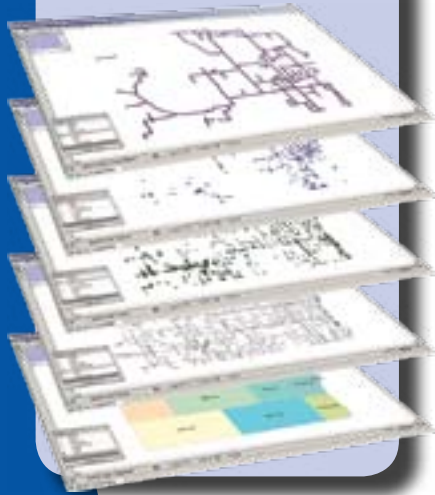
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# GIS-Based Map Interface

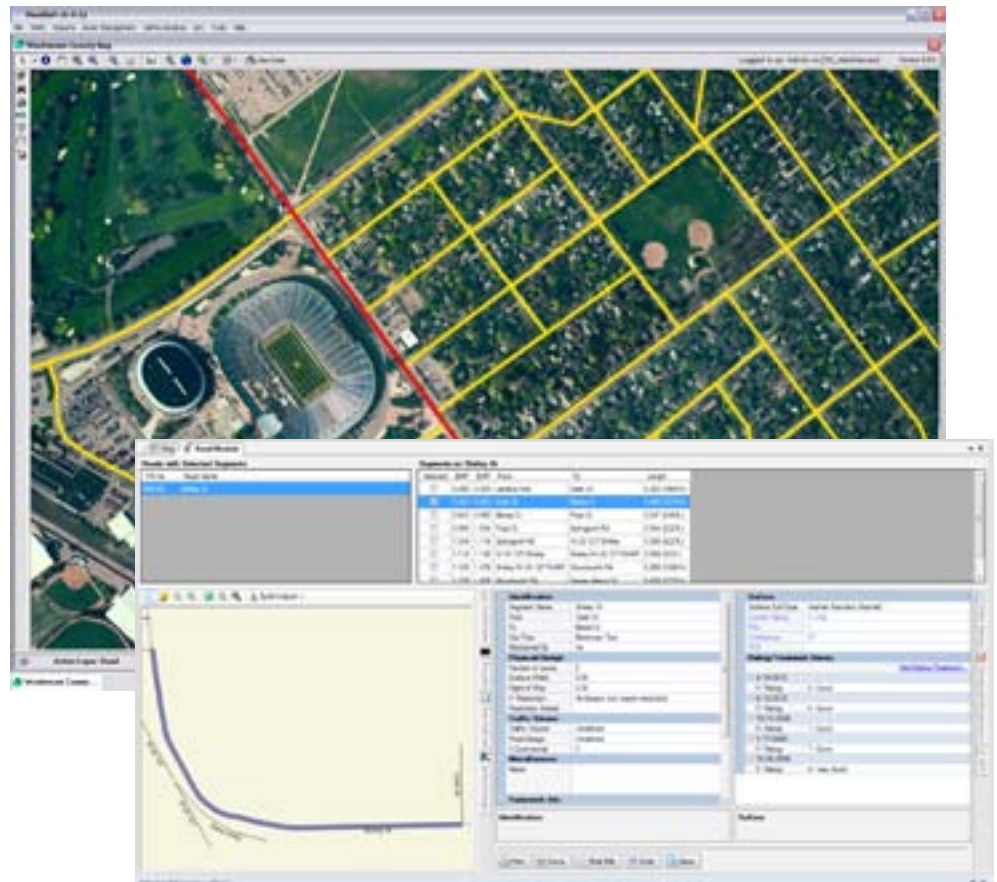
## Data Layers

When you make a data layer visible in *Roadsoft*, items associated with that layer appear on the GIS map. Making multiple layers visible simultaneously provides a clear view of the physical relationship between different types of data on the map.



A *Geographic Information System* (GIS) is the technology used to organize, analyze, and view data from a spatial perspective. A GIS map organizes information into layers that allow you to display different types of data simultaneously. In *Roadsoft*, each layer of the map is connected to data in the database. When you select an item on a layer, the system makes available the database records associated with that item.

*Roadsoft* uses an integrated database, which means the data for all of the layers are interconnected between multiple tables. This integration of data establishes relationships between different types of data and aids in complex data analysis.



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# Mobile Data Collection

## Collecting Data

With the Laptop Data Collector (LDC) and a low-cost GPS, you can collect data from the passenger seat of a moving vehicle. As you travel along a road, the GPS communicates your position to the LDC, which grabs the asset nearest you, and then opens all associated database records. You enter the data you need and then move on. It all happens real-time at the pace you set for yourself.



The time required to collect and enter data is often the highest hurdle standing between you and a useful information management system. How can you get over this hurdle? The *Roadsoft* Laptop Data Collector (LDC) will give you a boost.

The LDC, a mobile data collection utility designed specifically for entering data into *Roadsoft*, enables you to collect and enter pavement, signs and other asset information from the passenger seat of a moving vehicle. To get started, simply install it on your laptop, load the appropriate map and data files, attach a low-cost GPS, and you're ready to go. It's easy to use, convenient and proven.



## Easy to Use

The passenger seat of a moving vehicle is a difficult place to use software. The *Roadsoft* development team understood this fact, which is why they designed the LDC unlike other pieces of software. "Plug-and-play" communication with the GPS, fields that fill in automatically, and extensive use of keyboard shortcuts make the LDC amazingly easy to use – in the office or on the road.

## Convenient

The LDC uses the same map files as *Roadsoft*, but requires only a small piece of the main database, which makes data transfer and synchronization simple, quick, and convenient. And the LDC connects easily to any GPS that meets NMEA 0183 requirements. In fact, the less expensive GPS units work best because they don't include proprietary security features like many of the more expensive units.

## Proven

Since 2003, almost 300 local and regional agencies in Michigan and the Michigan Department of Transportation have used the LDC to collect Pavement Surface Evaluation Ratings (PASER) on the State's federal aid and local road networks, logging over 250,000 miles of data collection travel.

*"The Laptop Data Collector is efficient and easy to use; rating roads is a breeze. It's obviously designed with the end-user in mind."*

Vince – GIS Coordinator and Transportation Planner



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# Inventory of Assets

## Foundations

Establishing an inventory of assets for an asset management system is like pouring footings and laying block before building a house. It requires a significant investment of time, money, and effort, and most if it is buried and out of sight when you're finished.

Like a foundation for a beautiful house, an inventory of assets for an asset management system provides a solid base on which to build more visible, exciting, and valuable structures.



You're probably responsible for several different types of roads, thousands of signs, miles of guardrails, and many other valuable assets within your jurisdiction. Wouldn't it be nice to know that you're doing everything you can to manage and maintain these assets at an optimum level of effectiveness? Millions of dollars worth of transportation assets are wasted every year within roadway systems across the U.S. simply because people are overwhelmed by all the information.

How can you manage it all so it makes sense? *Roadsoft* can help.

*Roadsoft* enables you to build and maintain a complete, detailed inventory of transportation assets for your jurisdiction. With *Roadsoft* you never have to wonder or guess; you'll know exactly what you have, where it is, and what to do to keep it working well. The bottom line: you'll enjoy a clearer view of your bottom line.

The *Roadsoft* database enables you to build and maintain an inventory of roads, signs, culverts, guardrails, pavement markings and other assets. For each type of asset in the database, *Roadsoft* stores the following basic information:

- ◆ Location along a road using a linear reference or GPS coordinates
- ◆ Physical description
- ◆ Construction, maintenance, inspection, and rating information

In addition to the basic information, *Roadsoft* stores the following additional information for specific types of assets:

- ◆ Curb and gutter, shoulders, and traffic counts for roads
- ◆ Sign retroreflectivity
- ◆ Approaching and departing terminals for guardrails, along with individual records for beams, blocks, and posts
- ◆ Culvert entrance and exit structures, depth of cover, and skew angle.
- ◆ Application date for pavement markings
- ◆ Much more – contact the Center for Technology & Training at (906) 487-2102 for more information.

*“The more information I add, the more powerful and useful Roadsoft gets!”*

Matt – Engineer Technician



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# Pavement Management and Analysis Tools

## A Mix of Fixes

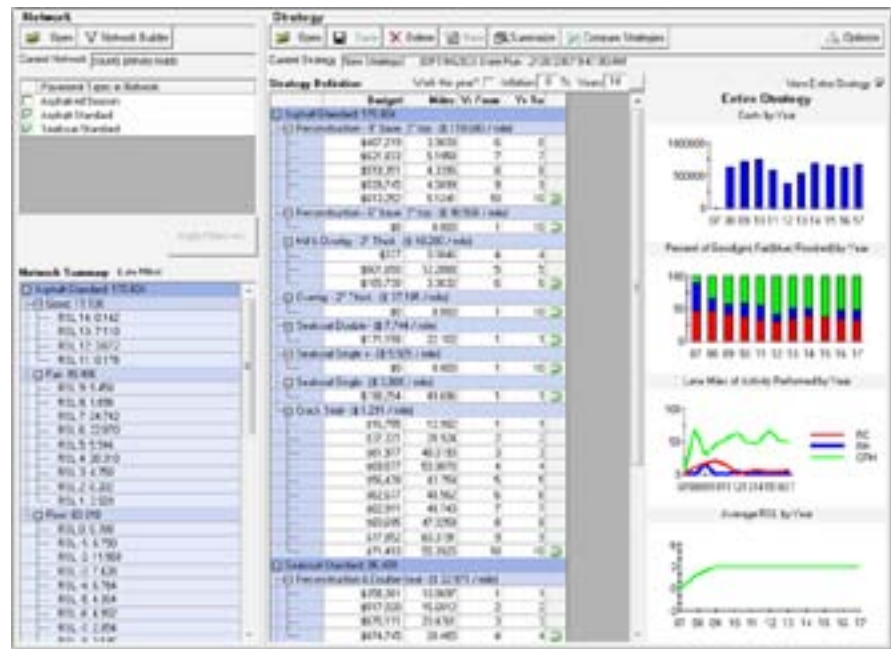
Historically, our roads have been managed with a “worst first” strategy, and reconstruction has been the preferred maintenance activity. But experience has taught us that carefully administered preventive maintenance activities go a long way toward extending the life of our roads.

The Strategy Evaluation and Strategy Optimization features of *Roadsoft* use pavement deterioration curves, statistical analysis functions, and other mathematical optimization tools to determine specific combinations of maintenance activities that provide the greatest return on your investment.

Different types of pavement deteriorate at different rates, and different maintenance activities affect the service life of the pavement differently. Everything costs money and everyone is being forced to do more with less. Plus, political pressures associated with managing roads are steadily increasing. The process of finding the perfect combination of maintenance activities is mind boggling in its complexity.

How can you figure it all out; and how can you possibly explain it to anyone?

The *Strategy Evaluation* and *Strategy Optimization* features of *Roadsoft* cut through the confusion. To begin, you enter current condition values and define the performance of different types of construction and maintenance activities. Then you enter the amount of money you have available in your budget and the construction and maintenance activities that you want to consider. With a few mouse clicks you can generate a plan that combines construction and maintenance activities to maximize service life across the network of roads being analyzed. The evaluation and optimization features help you to make the most of all your resources. Not only that, but the software creates a plan that is clear enough to explain to whomever else needs to know.



*“The strategy evaluation and optimization tools help us generate pavement management plans that our decision-makers understand. We’re able to apply the right fix in the right place at the right time.”*

Brian – County Highway Engineer



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# Detailed Reports, Data Mining and Exports

## Real-Time Results

It has been raining hard for hours and snow is melting fast this Spring day. Two major rivers in your jurisdiction are near flood stage. You know from experience that any bit of debris that restricts the flow of water under the roads that cross these rivers can cause serious flooding.

You open the *Roadsoft* report and filter tool. Within minutes you print a detailed report that lists every culvert along the two swollen rivers. With the report in hand, your maintenance crew heads out to inspect the river crossings. They clean two culverts that are nearly clogged with branches and debris. Together you avoid a minor disaster.



*Roadsoft* reports provide a simple, clear summary of the status of specific information in the database. *Roadsoft* includes over 50 default reports, and allows an almost unlimited number of custom reports using the extensive data mining capabilities. You can also export the data from generated reports for use in other database programs and export the entire GIS file for use in other GIS applications.

Act 58 Local System	PASIR Rating										Not Rated	Total Mileage	
	10	9	8	7	6	5	4	3	2	1			
City Major	0.413	0.008	1.309	1.156	1.241	0.390	0.032	3.282	0.000	0.000	0.000	5.438	
City Minor	0.000	1.279	3.842	1.162	3.676	0.388	1.852	3.600	0.029	0.000	0.000	6.698	
County Local	0.000	2.714	38.898	31.291	72.533	7.991	325.244	13.093	25.453	3.216	0.415	529.846	
County Friman	7.675	4.647	55.535	33.558	39.302	21.571	32.040	15.798	2.315	0.000	0.000	213.522	
											0.000	81.688	
												157.022	164.321
												165.467	1001.796

City/Township No. and Name	Surface Type							Total Mileage
	Undeveloped	Earth	Grass	Gravel	Seal Coat	Asphalt	Concrete	
1940 Alcona Twp	37.404	6.840	0.000	5.955	8.485	22.983	0.000	81.691
12400 Careorkia Twp	5.880	17.000	0.000	20.801	17.034	19.015	0.000	89.730
19320 Curtis Twp	21.865	32.724	0.000	38.623	16.044	24.071	0.000	133.328
34820 Greenbush Twp	3.621	10.965	0.000	8.518	12.722	25.045	0.000	60.873
35740 Gustin Twp	4.090	3.993	0.000	11.064	26.050	13.865	0.000	63.781
30490 Harrisville	0.327	0.922	0.000	0.022	0.000	8.103	0.000	9.474
30880 Harrisville Twp	4.202	6.179	0.000	21.452	29.905	12.582	0.067	74.387
37220 Haven Twp	8.565	13.467	0.000	24.183	11.944	18.328	0.000	76.486
37380 Harnes Twp	1.104	6.935	0.000	10.115	16.798	19.397	0.000	59.450

The screenshot shows the 'Road Reports' window in the Roadsoft application. A list of reports is displayed, including 'RSM Surface Type Mileage By Township', 'RSM Latest Surface Rating Report', 'RSM Last Rating Entered Report', 'RSM Miles Rated By City/Twp', 'RSM Rating History Report', 'RSM Scheduled Construction/Maintenance Activity Report', 'RSM Surface Type Mileage By Township', 'RSM Surface and Rating Segments Not Migrated Report', and 'RSM Unassigned Segments Not Migrated Report'. The 'RSM Surface Type Mileage By Township' report is selected. Below the list is a filter tool with a 'Field' list (including Act 58, City/Twp, County, Federal Aid, National Function Class, Surface Sub-Type, Surface Type, Latest Surface Rating, Latest Eval Date, Latest Eval Year, Current Surface Rating, Remaining Service Life (RSL), RSL Confidence) and an 'Operator' list. A 'Value' field is also present. Buttons for 'Preview Report', 'Export to File', and 'Close' are visible on the right side of the window.



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# Safety Analysis Tools

## From Information to Understanding

Data becomes useful when you understand it. Data becomes valuable when you do something based on that understanding. Organizations that transform data into useful information make decisions quickly, manage assets effectively and improve continuously.

The safety analysis tools in *Roadsoft* organize and present your jurisdiction's crash data so you can make decisions that improve the safety of your roads. Is there anything more valuable?



Every crash in your jurisdiction is connected to a wealth of information that you can use to make your roads safer. All of that information is useless if you don't understand it. The safety analysis features in *Roadsoft* organize your crash data in ways that are easy to understand.

## Key Features

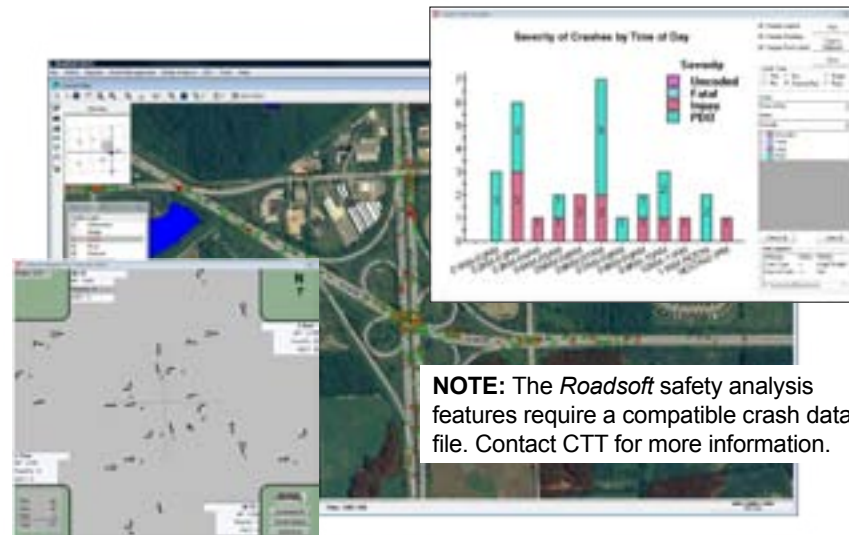
**Detailed Safety Analysis** tools enable you to analyze intersections, segments and curves, generate graphs to provide visual representations of trends, identify roads eligible for federal safety funding, and more.

**Network Diagnostics** tools enable you to examine individual crashes to establish patterns and relationships, which can help identify areas where engineering changes could reduce the frequency and severity of crashes. Once you've identified problem areas, built-in links to NCHRP documentation can help you implement countermeasures.

**Integrated Crash Data** allows you to visually compare crash data to roadway layers such as signs and signals. You can also overlay aerial photos and navigate through all levels of detail, including a public copy of the actual crash form.

**Powerful Reporting** features include detailed standard crash reports and advanced filtering options, which allow unlimited reporting capabilities.

**Collision Diagrams** provide visual representations of crash distributions at specific intersections. Collision diagrams also provide a means for measuring improvements, such as signal timing changes or additional signage.



**NOTE:** The *Roadsoft* safety analysis features require a compatible crash data file. Contact CTT for more information.

*"The Roadsoft safety analysis tools provide a concise way of looking at complicated crash information."*

Dean – Traffic Engineer



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# Sign Management Tools

## Get a Head Start

Do your sign management practices comply with the new MUTCD sign retroreflectivity requirements?

The *Roadsoft* Sign Module includes tools and features to help you set up a sign management plan for your agency today. The sign module supports all MUTCD inspection methods, including nighttime inspection, measured retroreflectivity, expected life, blanket replacement, and control signs.



The *Roadsoft* sign module includes tools and features that help you to create a location-based sign management system for your agency.

In addition to features for creating and maintaining a detailed inventory of signs and supports, the module includes features for inspecting and recording sign and support condition information, including retroreflectivity.

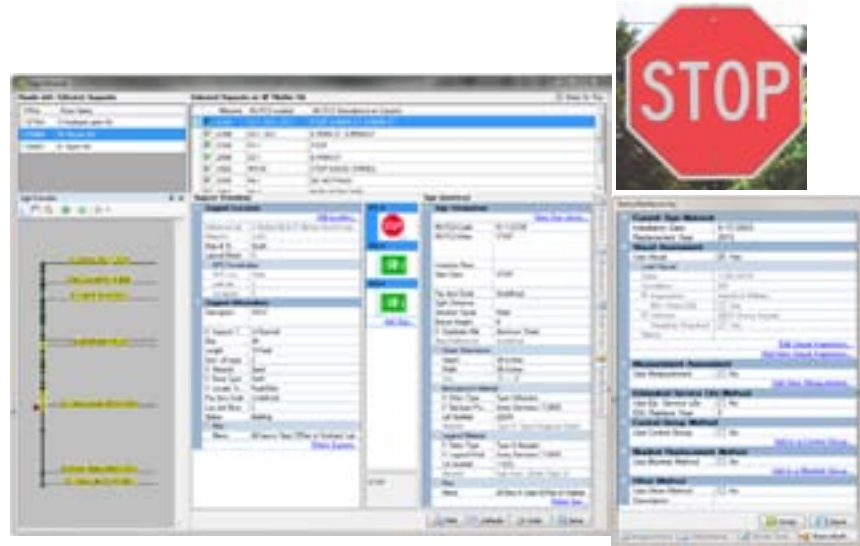
## Key Features

**Mobile Data Collection** with the *Roadsoft* Laptop Data Collector (LDC) provides a practical, time-efficient way to establish an inventory of your signs and collect physical condition and retroreflectivity data.

**Sign Inspection and Management** features provide a convenient way to create and track condition, maintenance and retroreflectivity records. Work orders provide a means for clearly communicating with your maintenance crew, and also establish a solid audit trail to help resolve future data or legal problems.

**User-Defined Priorities** allow you to adjust the level of urgency for specific types of signs and maintenance tasks to ensure that the most important work is completed first.

**The Sign Library** is pre-loaded with a complete set of signs, based on the Federal MUTCD. The Sign Viewer/Loader utility allows you to customize the default library with any unique signs your agency uses.



*“Working for a rural county with limited resources, I appreciate the power and simplicity of the Roadsoft sign module. Without it, I would not be able to keep up with the inspection and maintenance of our 3,200 road signs.”*

Harold - Road Commission Superintendent



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