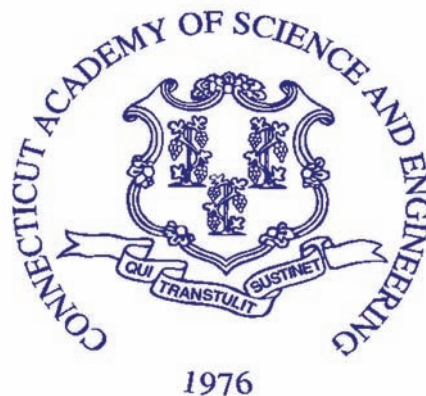


# APPLYING TRANSPORTATION ASSET MANAGEMENT IN CONNECTICUT

DECEMBER 2008

A REPORT BY

THE CONNECTICUT  
ACADEMY OF SCIENCE  
AND ENGINEERING



FOR

THE CONNECTICUT  
DEPARTMENT OF TRANSPORTATION



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ORIGIN OF INQUIRY: CONNECTICUT DEPARTMENT OF  
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This study was initiated at the request of the Connecticut Department of Transportation on November 7, 2007. The project was conducted by an Academy Study Committee with the support of Study Managers Nicholas Lownes, PhD, and Adam Zofka, PhD. The content of this report lies within the province of the Academy's Transportation Systems Technical Board. The report has been reviewed by Academy Members Peter G. Cable, PhD and A. George Foyt, PhD. Martha Sherman, the Academy's Managing Editor, edited the report. The report is hereby released with the approval of the Academy Council.

Richard H. Strauss  
Executive Director

#### Disclaimer

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<b>16. Abstract</b> The study consists primarily of a detailed review of those states that utilize transportation asset management systems that may be applicable for Connecticut's consideration, and includes as well the identification of a comprehensive pavement life-cycle analysis tool. The primary conclusion of this study is that, across the United States, states are finding the shift to Transportation Asset Management Systems worthwhile and productive as they are steadily seeing the condition of their assets improve and their resource allocation decisions galvanizing around an increasingly coherent vision for their transportation infrastructure. The findings indicate that ConnDOT should consider utilizing five concepts (Clarity, Communication, Champion, Consistency, and Comprehensive), the 5Cs, as a strategy for TAM implementation. The 5Cs provide a focus for ConnDOT's development of a sustainable TAM program to guide the state's investment in the acquisition, construction, repair, and preservation of the state's transportation assets.			
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## GLOSSARY OF ABBREVIATIONS

<b>AASHTO</b>	American Association of State Highway and Transportation Officials
<b>AIMS</b>	Airport Information Management System
<b>BMS</b>	Bridge Management System
<b>BTS</b>	Bureau of Transportation Statistics
<b>CASE</b>	Connecticut Academy of Science and Engineering
<b>CDOT</b>	Colorado Department of Transportation
<b>CMS</b>	Congestion Management System
<b>ConnDOT</b>	Connecticut Department of Transportation
<b>DOT</b>	Department of Transportation
<b>FAA</b>	Federal Aviation Administration
<b>FDOT</b>	Florida Department of Transportation
<b>FHWA</b>	Federal Highway Administration
<b>FRWP</b>	Final Regional Work Program (NY)
<b>FTP</b>	Florida Transportation Plan
<b>GIS</b>	Geographic Information System
<b>HAL</b>	High Accident Location
<b>HPMS</b>	Highway Performance Monitoring System (CT)
<b>ISMS</b>	Information Safety Management System (OR)
<b>ISTEA</b>	Intermodal Surface Transportation Efficiency Act
<b>ITIS</b>	Integrated Transportation Information System (OR)
<b>ITS</b>	Intelligent Transportation Systems
<b>LCCA</b>	Life-Cycle Cost Analysis
<b>MAA</b>	Maryland Aviation Administration
<b>MATS</b>	Maintenance Activity Tracking System (VT)
<b>MdTA</b>	Maryland Transportation Authority
<b>MnDOT</b>	Minnesota Department of Transportation
<b>MoDOT</b>	Missouri Department of Transportation
<b>MPA</b>	Maryland Port Administration
<b>MPO</b>	Metropolitan Planning Organization
<b>MTA</b>	Maryland Transit Authority
<b>MTP</b>	Maryland Transportation Plan
<b>MVA</b>	Motor Vehicle Administration (MD)

<b>NCDOT</b>	North Carolina Department of Transportation
<b>NCHRP</b>	National Cooperative Highway Research Program
<b>NHS</b>	National Highway System
<b>NPV</b>	Net Present Value
<b>NYSDOT</b>	New York State Department of Transportation
<b>ODOT</b>	Oregon Department of Transportation
<b>OPM</b>	Office of Policy and Management (CT)
<b>OTC</b>	Oregon Transportation Commission
<b>OTIA</b>	Oregon Transportation Investment Act
<b>OTMS</b>	Oregon Transportation management System
<b>OTP</b>	Oregon Transportation Plan
<b>PHD</b>	Person Hours of Delay
<b>PM</b>	Pavement Management
<b>PMS</b>	Pavement Management System
<b>P/PMIS</b>	Project and Program Management Information System
<b>PSMS</b>	Project Safety Management System (OR)
<b>RCW</b>	Revised Code of Washington
<b>RPA</b>	Regional Planning Agency
<b>RPC</b>	Regional Planning Commission (VT)
<b>RPO</b>	Regional Planning Organization (MD)
<b>SHA</b>	State Highway Administration (MD)
<b>STIP</b>	State Transportation Improvement Program
<b>TAM</b>	Transportation Asset Management
<b>TDD</b>	Transportation Development Division (OR)
<b>TIPM</b>	Transportation Infrastructure Performance Management (CT)
<b>TRB</b>	Transportation Research Board
<b>VMT</b>	Vehicle Miles Traveled
<b>VTrans</b>	Vermont Agency of Transportation
<b>WisDOT</b>	Wisconsin Department of Transportation
<b>WSDOT</b>	Washington Department of Transportation

## EXECUTIVE SUMMARY

This study, *Applying Transportation Asset Management in Connecticut*, was conducted for the Connecticut Department of Transportation (ConnDOT) by the Connecticut Academy of Science and Engineering (CASE). The study consists primarily of a detailed review of those states that utilize transportation asset management systems that may be applicable for Connecticut's consideration, and includes as well the identification of a comprehensive pavement life-cycle analysis tool.

## BACKGROUND

The American Association of State Highway and Transportation Officials (AASHTO) adopted the following definition of Transportation Asset Management (TAM) (NCHRP 2002):

Transportation Asset Management is a strategic and systematic process of operating, maintaining, upgrading, and expanding physical assets effectively throughout their life cycle. It focuses on business and engineering practices for resource allocation and utilization, with the objective of better decision making based upon quality information and well defined objectives.

This definition concisely summarizes some of the key qualities of any TAM system:

1. It is a strategic and systematic process.
2. It incorporates costs and benefits over the entire life cycle of assets.
3. It is concerned with resource allocation.
4. It requires quality data and well defined objectives as necessary components of any system.

Although the report focuses primarily on highway and bridge assets, TAM also can be applied to other transportation assets. It is a multimodal management strategy that provides a systematic approach to making the best transportation system investment decisions to sustain and improve the mobility of goods and people, and improve the quality of life of the public.

## SCOPE

The following research was conducted to investigate best TAM practices that might be utilized in Connecticut:

- Existing literature was surveyed to identify the broad principles that guide TAM implementation and use in the United States and other countries. Also, brief summaries of the TAM systems in Colorado, Florida, Missouri, Michigan, Minnesota, Ohio, Washington and Wisconsin were developed to articulate each state's experience and practices.
- The TAM systems from Maryland, New York, North Carolina, Oregon and Vermont were selected for more thorough, in-depth analysis of their practices. These five states

helped place the broad principles in a more concrete context and highlighted their applicability for ConnDOT's consideration in developing a TAM system for the state.

- Focus groups of transportation professionals within ConnDOT, as well as representatives from the General Assembly and the state's executive branch, were conducted to identify current practices that could be included in a Connecticut-based TAM system, as well as other practices that may need revision or substitution.

## **BRIEF STATEMENT OF PRIMARY CONCLUSION**

The primary conclusion of this study is that, across the United States, individual states are finding the shift to Transportation Asset Management Systems worthwhile and productive as they are steadily seeing the condition of their assets improve and their resource allocation decisions galvanizing around an increasingly coherent vision for their transportation infrastructure.

## **SUMMARY OF FINDINGS AND SUGGESTIONS**

The findings of this study indicate that ConnDOT should consider utilizing five concepts, which have been identified as the 5Cs, as a strategy for TAM implementation. The 5Cs organize and provide a structure for five concepts that were consistently identified as critical for achieving success in TAM. The 5Cs embody the principles of TAM that were highlighted in many previous studies and reports and within the focus group discussions conducted as part of this project. The 5Cs of Asset Management provide a focus for ConnDOT's development of a sustainable TAM program to guide the state's investment in the acquisition, construction, repair, and preservation of the state's transportation assets. The 5Cs are briefly described as follows:

### ***Clarity***

A clearly stated vision and a process for implementation are necessary for successful implementation of any TAM system. ConnDOT should consider clearly defining its goals, objectives and performance measures to assure that a strong foundation and framework is created for its TAM program. Also, adopting enabling TAM legislation has proven a successful strategy in other states and should be considered as part of the state's TAM implementation strategy.

### ***Communication***

TAM tools are novel and useful because they support managing transportation assets from a systems and life-cycle perspective, as opposed to utilizing a class-specific, worst-first asset management philosophy for investment decision making. Communication throughout the organization, both vertically and horizontally and with other agencies and branches of state government, is critical for creating and maintaining a successful TAM system. Consideration should be given to developing clear communication channels between ConnDOT's senior management, the executive branch, and legislators to assure effective coordination, management and unbiased performance reporting. "What if?" analyses are useful means of communicating the performance-based impacts of funding decisions.

### *Champion*

Visible and active ConnDOT champion(s) are needed to guide and support successful TAM implementation and sustainability. It is suggested that strong and consistent support at the leadership level is necessary to implement an effective and comprehensive TAM system. ConnDOT senior management and staff need to be committed to the asset management program and understand the value and benefits of implementing TAM.

### *Consistency*

Consistency on several levels is important: consistency in the message from the state leadership to those in the field; consistency in the priorities across various administrations, and consistency within the data collection and sharing practices among ConnDOT bureaus. It is suggested that

- a TAM steering committee be established that includes key senior ConnDOT management staff with representation from all bureaus;
- the Bureau of Policy and Planning's Transportation Infrastructure Performance Management group provide the administrative support for the committee; and
- inter-bureau information sharing on TAM topics be incorporated into a coordinated system.

### *Comprehensive*

It is necessary to recognize that each asset class of transportation infrastructure is part of an overall transportation system, and that the goal of managing this system is not to "get by" year to year, but to best manage resources and investments over the long term – that is, over the life cycle of the assets. Worst-first management ignores life-cycle costs, as does a philosophy of always selecting the least expensive short-term alternative. In moving away from a worst-first and lowest-cost practice, ConnDOT should consider pursuing a life-cycle cost-effectiveness strategy, while continuing to ensure that safety standards are rigorously maintained.

A shift to a TAM system would be a major change in the way the department and the state approaches investment in transportation assets. This change demands a clear vision, excellent communication, champion(s), and a comprehensive perspective to assure success. Around the country, states are finding this shift worthwhile as they are steadily seeing the condition of their assets improve and their resource allocation decisions galvanizing around an increasingly coherent vision for their transportation infrastructure.