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**ID:** 00933754

# Title: ESTIMATING AGENCY COST OF MAINTENANCE, REPAIR, AND REHABILITATION FOR FLORIDA BRIDGES

**Author:** Sobanjo, JO; **Thompson, PD**; Lewis, M; Kerr, R

**Corporate Author:** Transportation Research Board

**Series:** Transportation Research Record 1795

**Pages:** pp 66-73

**Date:** 2002

**ISBN:** 0309077222

**ISSN:** 03611981

**Features:** 4 Tab. 16 Ref.

**Abstract:** The Florida Department of Transportation (FDOT) recently conducted a study to develop agency cost factors for maintenance, rehabilitation, and repair (MR&R) of bridges, for the state's implementation of the AASHTOWare Pontis Bridge Management System. The study analyzed three information systems on maintenance and construction history available at the FDOT. Pontis defines many combinations of bridge element, environment, condition, and feasible action, resulting in more unit cost values than can be estimated from the available data. To simplify cost determination, a classification scheme (MR&R Action Subcategory) was devised to group the Pontis combinations. Statistical analysis was performed on the raw cost data to extract useful numbers from the available data sources. The results were supplemented with the judgment of an FDOT panel of experts. Although the panel found the analysis of historical data to be useful for 70% of the actions considered, only 50% of the actions had a statistically significant sample, and only 15% were usable directly from a statistical analysis. The main issues were differences in data collection units and differences or uncertainties in the scope of recorded actions. The study recommended improvements in the automated systems to enhance the ability to use the data in future updates of the agency cost model.

**Notes:** This paper appears in Transportation Research Record No. 1795, Maintenance of Pavements and Structures.

**Descriptors:** Bridge management systems // Cost estimating // Maintenance // Repairing // Rehabilitation (Maintenance) // Recommendations // Improvements // Florida

**Status:** AVAILABLE TRB BOOKSTORE

**Availability:** http://209.43.39.60/acb1/showdetl.cfm?&DID=92&Product_ID=6267&CATID=1&series=1

**ID:** 00810876

# Title: DEVELOPMENT OF PONTIS USER COST MODELS FOR FLORIDA

**Author:** **Thompson, PD**; Najafi, FT; Soares, R; Kerr, R

**Corporate Author:** Transportation Research Board

**Series:** Transportation Research Circular 498

**Pages:** 15p

**Date:** June 2000

**ISSN:** 00978515

**Project Number:** D-1, IBMC99-009

**Features:** 4 Fig. 3 Tab. 7 Ref.

**Conference:** Eighth International Bridge Management Conference, Denver, Colorado, April 26, 1999-April 28, 1999,Transportation Research Board Committee on Bridge Maintenance and Management (A3C06)

**Abstract:** The Florida Department of Transportation has commissioned the University of Florida to perform a research study to develop user cost models for the Department's implementation of AASHTOWare (trademark) Pontis (trademark). The project features a literature review and survey, a thorough analysis of the sensitivity of Pontis to various user cost factors using Florida bridge data, gathering of additional data available within the Department, and analysis of the additional data. Because Pontis is already installed and operational, the research necessarily has a strong implementation component, working closely with the users of the system to ensure that the results can readily be put into practice. Among the products of the research will be some improved components of the user cost model, and a roadmap for the agency to supplement its existing data resources in the future to continue to improve the effectiveness of the models. At its current stage, the project has developed an updated description of the mathematical form of the models, using a software testing methodology that may prove useful to any agency evaluating the reliability and suitability of new engineering or decision support software. The sensitivity analysis has identified the strengths and weaknesses of the model and established priorities for further investigation in the rest of the study. A request has been made to the Pontis Task Force for certain enhancements to allow Pontis to accept the improved components that Florida would like to develop.

**Descriptors:** Bridge management systems // Implementation // Sensitivity analysis // Data collection // Software // Testing // Reliability // Literature reviews // User cost models // Florida

**Status:** AVAILABLE TRB BOOKSTORE

**Availability:** http://209.43.39.60/acb1/showdetl.cfm?&DID=92&Product_ID=5839&CATID=1&series=3

**ID:** 00810891

# Title: THE NEW ONTARIO BRIDGE MANAGEMENT SYSTEM

**Author: Thompson, PD**; Merlo, T; Kerr, B; Cheetham, A; Ellis, R

**Corporate Author:** Transportation Research Board

**Series:** Transportation Research Circular 498

**Pages:** 15p

**Date:** June 2000

**ISSN:** 00978515

**Project Number:** F-6, IBMC99-010

**Features:** 7 Fig. 10 Ref.

**Conference:** Eighth International Bridge Management Conference, Denver, Colorado, April 26, 1999-April 28, 1999,Transportation Research Board Committee on Bridge Maintenance and Management (A3C06)

**Abstract:** Ontario's Ministry of Transportation (MTO) is responsible for the management of approximately 3000 bridges on the provincial highway network. The MTO in recent years has been evaluating developments in Bridge Management Systems (BMSs) in relation to its own requirements. The MTO decided to develop an all-new system, similar in network-level functionality to modern systems developed in other countries, but more detailed in its project-level capabilities than any existing system. It would build on a substantial body of research conducted by the MTO over the past decade in the subjects of treatment selection, effectiveness, and costing. The MTO engaged ITX Stanley, Ltd., to provide this tool, to be called OBMS, in a project which began in January of 1998 and is due to be completed by the end of 1999. Written in Visual Basic for client-server deployment, OBMS is a completely new system from the ground up, and not an adaptation of any existing system. It features a knowledge-based approach to treatment selection, and a tender item basis for direct and indirect cost estimation, for project-level decision support to the MTO's engineer- inspectors in the field. Fully integrated into the engineer's OBMS desktop are electronic maps of bridge and non-bridge data from the MTO's geographic information system; input and output of electronic documents, including inspection photographs; and historical data on maintenance and rehabilitation. Object-oriented methods for design and development have provided innovative approaches to user interface design, system integration, and rapid analyst-in-the-loop optimization at both the project and network levels.

**Descriptors:** Bridge management systems // Cost estimating // Decision support systems // Rehabilitation (Maintenance) // User interfaces (Computer science) // Optimization // Innovation // Ontario

**Status:** AVAILABLE TRB BOOKSTORE

**Availability:** http://209.43.39.60/acb1/showdetl.cfm?&DID=92&Product_ID=5839&CATID=1&series=3

**ID:** 00810905

# Title: VIRTIS: AASHTO'S NEW BRIDGE LOAD RATING SYSTEM

**Author: Thompson, PD**; Duray, JA; Campbell, JJ; Puckett, JA; Wright, B

**Corporate Author:** Transportation Research Board

**Series:** Transportation Research Circular 498

**Pages:** 14p

**Date:** June 2000

**ISSN:** 00978515

**Project Number:** K-1, IBMC99-011

**Features:** 4 Fig. 1 Tab. 2 Ref.

**Conference:** Eighth International Bridge Management Conference, Denver, Colorado, April 26, 1999-April 28, 1999,Transportation Research Board Committee on Bridge Maintenance and Management (A3C06)

**Abstract:** The American Association of State Highway and Transportation Officials ( AASHTO) is nearing completion of a three-year project to develop a new combined set of bridge load rating and design tools, to be known as Virtis and Opis, respectively. A development team led by Michael Baker Jr., Inc., is developing the systems, which are funded by the contributions of over thirty states and the Federal Highway Administration. The project is intended to replace AASHTO's aging BARS and BDS software packages with a new generation of flexible, user-friendly capabilities that will substantially enhance the value of bridge load rating data by providing convenient, organized ways to enter, manage, access, and apply the information. When the current project is complete, Virtis will be able to perform load factor ratings on most types of steel, reinforced concrete, and prestressed concrete bridges, with timber and trusses being considered for the near future. The system is designed to be adapted to load and resistance factor evaluation when the specification is approved. With a highly modular object-oriented architecture using Microsoft's Component Object Model (COM) specification, the system can be expanded by sophisticated users or third-party developers to add specialized features. One important application of this architecture is the ability to inter-operate with geographic information systems and overweight permit management systems.

**Descriptors:** Bridge design // Software packages // Geographic information systems // Computer architecture // Load ratings // Load and resistance factors // Systems integration // American Association of State Highway and Transp Officials

**Status:** AVAILABLE TRB'S BOOKSTORE

**Availability:** http://209.43.39.60/acb1/showdetl.cfm?&DID=92&Product_ID=5839&CATID=1&series=3

**ID:** 00711688

# Title: PONTIS VERSION 3: REACHING OUT TO THE BRIDGE MANAGEMENT COMMUNITY

**Author: Thompson, PD**

**Corporate Author:** Transportation Research Board

**Series:** Conference Proceedings 7, vol. 1

**Pages:** pp 197-202

**Date:** 1995

**ISBN:** 0309061091

**ISSN:** 10731652

**Features:** 2 Fig.

**Conference:** Fourth International Bridge Engineering Conference, San Francisco, CA, August 28-30, 1995. Transportation Research Board; Federal Highway Administration; Federal Railroad Administration; AASHTO, and California Dept. of Transportation

**Abstract:** AASHTO, through its AASHTOWare software joint development and support program, has recently adopted the Pontis bridge management system and has completed development of Release 3, to be known as AASHTOWare Pontis. With the participation of 46 state-level departments of transportation (DOTs) and FHWA, the project represents a significant effort to advance the implementation of the system and broaden its audience to include large and small transportation agencies, including local governments working in cooperation with their state DOTs. The Release 3 software will be a major advance in the product: it will be highly graphical in its user interface, work with a wide variety of commercial data base managers, employ an innovative system for coordinating the work of multiple decision makers, and include a state- of-the-art project-level analysis to complement its already-advanced network-level capabilities. Cambridge Systematics, Inc., as a contractor to AASHTO, developed the product.

**Descriptors:** AASHTO // BRIDGE MANAGEMENT SYSTEMS // SOFTWARE // GRAPHICS

**Status:** AVAILABLE FROM TRB BOOKSTORE

**Availability:** http://209.43.39.60/acb1/showdetl.cfm?&DID=92&Product_ID=1910&CATID=1&series=2

**ID:** 00724931

# Title: COLLECTING AND MANAGING COST DATA FOR BRIDGE MANAGEMENT SYSTEMS

**Author: Thompson, PD**; Markow, MJ

**Corporate Author:** Transportation Research Board

**Series:** NCHRP Synthesis of Highway Practice 227

**Pages:** 55p

**Date:** 1996

**ISBN:** 0309058724

**ISSN:** 05475570

**Project Number:** Project 20-5 FY 1993 Topic 25-06

**Features:** 3 Fig. 22 Tab. Refs.

**Abstract:** This synthesis will be of interest to state department of transportation (DOT) administrators and mid- to upper-level managers; researchers; cost estimators; bridge and general management system engineers; and bridge design, construction, inspection and maintenance engineers; as well as to private industry professionals involved in developing bridge management system (BMS) software and collecting and analyzing BMS cost data. The state of the practice for collecting and managing cost data for BMS is described based on data obtained from a review of the literature and a survey of the state DOTs. This report describes BMS cost data for work done by contract and in-house forces for state and local governments. It includes project-level cost estimation as well as the collection and management of data for network- level cost models. The various cost estimate methods for replacement; maintenance, repair and rehabilitation; and emergency work are analyzed as are the special requirements of user costs and other special economic data.

**Descriptors:** BRIDGE MANAGEMENT SYSTEMS // COST DATA // DATA COLLECTION // DATA MANAGEMENT // SOFTWARE // STATE OF THE ART STUDIES // LITERATURE SURVEYS // SURVEYS (DATA COLLECTION) // STATE DEPARTMENTS OF TRANSPORTATION // COST ESTIMATING // COST MODELS // USER COSTS

**Status:** AVAILABLE FROM TRB BOOKSTORE

**Availability:** http://nationalacademies.org/trb/bookstore (search for SYH227)

**ID:** 00662778

# Title: ROLE OF HIGHWAY MAINTENANCE IN INTEGRATED MANAGEMENT SYSTEMS

**Author:** Markow, MJ; Harrison, FD; **Thompson, PD**; Harper, EA; Hyman, WA; Alfelor, RM; Mortenson, WG; Alexander, TM

**Corporate Author:** Transportation Research Board Cambridge Systematics, Inc.

**Series:** NCHRP Report 363

**Pages:** 147p

**Date:** 1994

**ISBN:** 0309053617

**ISSN:** 00775614

**Project Number:** Project 14-9(4) FY'91

**Features:** 23 Fig.4 Tab.22 Ref.

**Abstract:** This report develops the conceptual design of the next generation maintenance management information system (MMIS), and considers its integration with other highway management systems. Maintenance management systems were developed about 25 years ago, as one of the early applications of mainframe computers to highway management. Since then, several trends in highway policy and programs, maintenance management and practice, new technologies for data acquisition, communications, and locational referencing, and advances in computer hardware and software have caused states to revisit the design and operation of their systems. This report presents a conceptual design of the next-generation MMIS, embodying advances in three areas: maintenance management approach, data handling technology, and database and system integration. The MMIS design concept recommended to achieve these advances is referred to as a "hub and spoke" approach, consisting of centralized pools of shared data and common procedures (the hub) serving a number of stations (the spokes), each with the capability to access a local subset of data and to perform specialized analyses. The prime advantage of the hub and spoke concept is that it is independent of computer platform and technology, and thus can be adapted to any of the variations of computer systems and architecture in use by DOTs today.

**Descriptors:** PAVEMENT MANAGEMENT SYSTEMS // MAINTENANCE MANAGEMENT // DATA MANAGEMENT // SYSTEMS INTEGRATION // HIGHWAY MAINTENANCE

**Status:** AVAILABLE FROM TRB BOOKSTORE

**Availability:** http://nationalacademies.org/trb/bookstore (search for NR363)

**ID:** 00648190

# Title: MAKING OPTIMIZATION PRACTICAL IN PAVEMENT MANAGEMENT SYSTEMS: LESSONS FROM LEADING-EDGE PROJECTS

**Author: Thompson, PD**

**Corporate Author:** Transportation Research Board

**Series:** Conference Proceedings 1 Vol. 2

**Pages:** pp 184-189

**Date:** 1994

**ISBN:** 0309055024

**ISSN:** 10731652

**Conference:** Third International Conference on Managing Pavements, San Antonio, Texas, May 22, 1994 - May 26, 1994, Transportation Research Board; Federal Highway Administration; Ontario Ministry of Transportation; American Association of State Highway and Transportation Officials; Texas Department of Transportation; International Society for Asphalt Pavements; and American Concrete Pavement Association.

**Abstract:** Much has been written in the past 10 years about the development of new optimization techniques for pavement management systems. However, few public agencies are using optimization in their routine budgeting and programming activities. The reasons for this and the keys to making optimization more practical lie in taking a new look at its role in decision making and at the means by which optimization techniques are implemented. Several recent projects to create new pavement management systems or revamp old ones have demonstrated that the techniques do not have to be excessively complex or data-intensive and that they can be very effectively implemented on personal computers connected to shared data bases. The effective use of optimization signals the beginning of a new generation of pavement management systems.

**Notes:** The proceedings of the Third International Conference on Managing Pavements is published in three volumes. Volumes 1 and 2, published prior to the conference, include papers to be presented at the conference. Volume 3, published after the conference, contains additional papers presented at the plenary and workshop sessions.

**Descriptors:** PAVEMENT MANAGEMENT SYSTEMS // OPTIMIZATION // DECISION MAKING // IMPLEMENTATION // PERSONAL COMPUTERS

**Status:** AVAILABLE FROM TRB BOOKSTORE

**Availability:** http://209.43.39.60/acb1/showdetl.cfm?&DID=92&Product_ID=1910&CATID=1&series=2

**ID:** 00611745

# Title: MICROCOMPUTER OPTIMIZATION OF LIGHT-PAVEMENT REHABILITATION

**Author: Thompson, PD**; Tapio, RO; Äijö, J

**Corporate Author:** Transportation Research Board

**Series:** Transportation Research Record 1291

**Pages:** pp 60-68

**Date:** 1991

**ISBN:** 0-309-05071-5

**ISSN:** 03611981

**Features:** 5 Fig. 1 Tab. 12 Ref.

**Abstract:** A Markovian decision model on a personal computer is being developed for Finland's Roads Administration to optimize the allocation of funding among rehabilitation actions, geographic regions, and traffic volume classes on roads with oil gravel and other light pavements. In the long term, the model recommends a funding allocation and condition distribution that minimizes the sum of agency and user costs; in the short term, it recommends a strategy to maximize annual progress toward the long-term goal. As traffic volume and network length grow, the system simulates their effect on rehabilitation policy.

**Notes:** This paper appears in Transportation Research Record No. 1291, Fifth International Conference on Low-Volume Roads, May 19-23, 1991, Raleigh, North Carolina, Volume 1.

**Descriptors:** LOW VOLUME ROADS // FINLAND // COMPUTER PROGRAMS // DECISION MAKING // PERSONAL COMPUTERS // OPTIMIZATION // FUND ALLOCATIONS // REHABILITATION

**Status:** OUT OF PRINT

**Availability:** http://nationalacademies.org/trb/publications/tris/out_of_print.html

**ID:** 00468753

# Title: A MICROCOMPUTER MANAGEMENT SYSTEM FOR SETTING HIGHWAY PRIORITIES AND SCHEDULING IMPROVEMENTS

**Author: Thompson, PD**; Neumann, LA; Humphrey, TF

**Corporate Author:** Transportation Research Board

**Series:** Transportation Research Record 1124

**Pages:** pp 17-25

**Date:** 1987

**ISBN:** 0-309-04504-5

**ISSN:** 03611981

**Features:** 7 Fig.

**Abstract:** Microcomputer technology offers significant potential to help in assessing infrastructure needs, analyzing priorities and tradeoffs, and managing maintenance programs and capital improvement projects at state and local levels. Illustrating this potential is a system now being used by the Metropolitan District Commission (MDC), a state agency responsible for 153 mi of commuter parkways and recreational roads in the Boston area. Operating on IBM personal computers with a commercial database manager, the system stores and manages data on pavement condition, traffic volume, bridges, signals, street lighting, sidewalks, curbing, and other roadside features. A single menu- and screen-oriented framework gives easy access to all of this information for viewing and updating, and for retrieval through standardized reports. Program development capabilities are provided for defining capital improvement projects, estimating their costs, setting priorities, and scheduling. The speed and flexibility of off-the-shelf hardware and software has made the initial system design and subsequent enhancements very efficient and responsive to MDC needs. By developing the system through many successive prototypes, evolving from the first quick-and-dirty demonstration up to the current polished production system, it has been possible for MDC staff to become comfortable with computers while simultaneously becoming informed participants on the design team. This development has led to a more satisfactory and useful final product.

**Notes:** This paper appeared in Transportation Research Record No. 1124, Transportation Needs, Priorities, and Financing.

**Descriptors:** MICROCOMPUTERS // MANAGEMENT SYSTEMS // PROJECTS // PRIORITY RATING // HIGHWAY IMPROVEMENTS // SCHEDULING // DATA STORAGE // DATA MANAGEMENT // PERSONAL COMPUTERS // COSTS // ESTIMATING

**Status:** OUT OF PRINT

**Availability:** http://nationalacademies.org/trb/publications/tris/out_of_print.html