SafetyAnalyst™

Introduction

The SafetyAnalyst software was developed as a cooperative effort between FHWA and participating state and local agencies and was transferred to AASHTO in 2010.

SafetyAnalyst provides a set of software tools for use by state and local highway agencies for highway safety management. These tools can be used to develop programming for site-specific highway safety improvements following the process and procedures in the Highway Safety Manual (HSM).

SafetyAnalyst incorporates the HSM safety management approaches into computerized analytical tools for guiding the decision-making process. Because it has a strong basis in cost-effectiveness analysis, SafetyAnalyst can play an important role in prioritizing improvements so that highway agencies get the greatest possible safety benefit from each dollar spent in the name of safety.

SafetyAnalyst

SafetyAnalyst integrates all parts of the highway safety management process into a single software package. SafetyAnalyst has four analytical tools:

1. The **Network Screening Tool** identifies sites with potential for safety improvements. Measures of effectiveness and statistical methodologies are used to provide a more a reliable list of locations warranting further investigation

2. The **Diagnosis and Countermeasure Selection Tool** is used to diagnose the nature of safety problems at specific sites and assist users in selecting effective countermeasures to address those problems. It facilitates thorough diagnosis through basic collision diagramming and identification of significant accident patterns, and systematic countermeasure selection through site-specific diagnostic questions.

3. The **Economic Appraisal and Priority Ranking Tool** performs an economic appraisal of countermeasures or alternative countermeasures for a specific site, an optimization of sites and countermeasures, and a priority ranking of alternative improvements.

   Optional benefit methodologies are provided to support requirements of the federal Highway Safety Improvement Program

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4. The **Countermeasure Evaluation Tool** provides the capability to conduct before/after evaluations of implemented safety improvements. New statistical methods provide valuable feedback on the effectiveness of completed countermeasures for reporting and future planning.

Data Requirements

The SafetyAnalyst software tools require a linked database of roadway characteristics, traffic volume, and crash data at the site level. Many of the required data elements are readily available to highway agencies. However, some effort to assemble and format the data will be needed. SafetyAnalyst includes a data management tool to help users import and manage their data. While many additional data elements are desirable and may be evaluated, the minimum set of data elements required to use SafetyAnalyst are crash and traffic data and either roadway segment, intersection, or ramp data.

- Crash Data: crash location, date, collision type, severity, relationship to junction, maneuvers by involved vehicles (straight ahead/left turn/right turn/etc.)

- Roadway Segment Characteristics Data: segment number, segment location (mapped to crash locations), segment length (mi), area type (rural/urban), number of through traffic lanes (by direction of travel), median type (divided/undivided), access control (freeway/ nonfreeway), two-way vs. one-way operation, traffic volume (AADT).

- Intersection Characteristics Data: intersection number, intersection location (mapped to crash locations), area type (rural/urban), number of intersection legs, type of intersection traffic control, major-road traffic volume (AADT), minor-road traffic volume (AADT)

- Ramp Characteristics Data: ramp number, ramp location (in a form that is linkable to crash locations), area type (rural/urban), ramp length (mi), ramp type (on-ramp/off-ramp/freeway-to-freeway ramp), ramp configuration (diamond/loop/directional), ramp traffic volume (AADT).

Hardware and Software Environments

Minimum Configuration Client Only

Hardware Requirements

Machine	x86 or x86_64, 1.8 GHz
Memory	1 GB
Video	1024x768, 16 bit colors
Mouse	Microsoft or compatible
Hard Disk	200 MB * (no local data set)

Software Requirements[2]

Microsoft Windows 2000 Professional, XP, XP64, Vista, or Linux version available on request

HTML browser, PDF viewer or RTF viewer required, CSV-capable spreadsheet program recommended

Recommended Configuration Standalone or Data Management Workstation

Hardware Requirements

Machine	x86 or x86_64, 3 GHz
Memory	2 GB
Video	1280x1024, 32 bit color
Mouse	Microsoft or compatible
Hard Disk	20 GB[1]

Software Requirements[2]

Microsoft Windows 2000 Professional, XP, XP64, Vista, or Linux version available on request

HTML browser, PDF viewer or RTF viewer required, CSV-capable spreadsheet program recommended

Database Server (Optional, recommended for enterprise deployments)

Hardware Requirements

Any hardware, operating system and database management system (DBMS) which supports the Java Database Connectivity (JDBC) API. Tested DBMS systems include Oracle, Sybase, MySQL and Microsoft SQL Server.	
Hard Disk	20 GB[1]
Network:	100 Mbit/s minimum, 1 Gbit/s recommended

Note: 1. Data storage requirements depend on the size of the inventory, traffic and crash datasets. For example, a near-production dataset of 34,000 roadways segments, 45,000 intersections, 600,000 crashes and 8 years of traffic data requires less than 1.4 GB on a local database.

2. SafetyAnalyst is implemented in the Java programming language. In general, it will run on any platform with a (Version 6) Java runtime environment and an ANSI C compiler. The optimizer used in Module 3 is lp_solve (http://sourceforge.net/projects/lpsolve), an open source Mixed Integer Linear Programming (MILP) solver. lp_solve is written in ANSI C and can be compiled on many different platforms like Linux and Windows. A Java wrapper for lp_solve is available and used by SafetyAnalyst

Current Annual Fees and Licensing Options

Single Workstation Option

This license allows use of SafetyAnalyst on a standalone personal computer. Use of the software under this license is limited to a single user at a time working on the same machine where the database is installed. This license option includes up to 24 hours in engineering support.

Annual fee: $11,000

Site License

This license allows use of SafetyAnalyst 1.0 on an unlimited number of workstations within an agency, and permits cities/counties, and contractors/consultants employed by the agency, access to the product on the Member Department's network. This license option includes up to 24 hours in engineering support. Each licensing agency shall designate a prime contact person through whom all support and maintenance will be funneled to the contractor.

Note: AASHTO member agencies wishing to exercise this option will be required to register the names and contact information for all contractors/consultants using SafetyAnalyst via their Site License and will be responsible for protecting AASHTO's intellectual property rights to the SafetyAnalyst product by having each contractor execute the Contractor Agreement in the form specified in Appendix A of the Supplemental License Agreement, and providing a copy of the executed Contractor Agreement to AASHTO.

Annual Fee: $22,500

International License

This SafetyAnalyst license is available for agencies in foreign countries with Associate-International membership in AASHTO. This license option includes up to 24 hours in engineering support. Each licensing agency shall designate a prime contact person through whom all support and maintenance will be funneled to the contractor. The licensing agency shall also be responsible for ensuring protection of AASHTO trademarks and copyrights for all copies of the software made available to the licensing agency within the constraints of the International License agreement.

Annual Fee: $22,500USD

Educational Option

This option exists for educational institutions within the jurisdictions of our Member Departments, and/or Associate Members to SafetyAnalyst free of charge for use in the classroom.

Note: A licensing agreement executed by the institution assuring compliance with the education and training limitation is necessary to exercise this option.

Service Units

For the period from July 1, 2010 through June 30, 2011, AASHTO has established an arrangement with the two SafetyAnalyst contractors, MRI and ITT, to offer the opportunity for agencies to acquire special fixed-fee increments or units of contractor-provided service for consultation and support to assist the agency in preparing data and using SafetyAnalyst. During this period, an agency may commit to one or more units of service from MRI and/or ITT. The fee for each unit of service provides approximately forty (40) total hours of labor by a contractor employee. Related travel expenses for on-site tasks will be converted to equivalent service units. The actual number of hours may vary depending on the AASHTO billing level of the employees involved. Service Units remaining at the conclusion of a fiscal year will be carried forward into the next fiscal year. The number of Service Units carried forward will be adjusted to reflect the subsequent year's price per unit, but the dollar value of the licensee's Service Units available will remain the same.

Service Unit Work Plan Development

AASHTO highly recommends that each agency review annual service needs with MRI and/or ITT and develop a firm estimate of the number of units required, as well as the schedule for delivery, prior to submitting their commitment. Further, the SafetyAnalyst Task Force reserves the right to review work plans for service unit work to ensure conformance with the guidelines for their use.

Using service units is not a pre-requisite to license SafetyAnalyst, nor does it affect in any way the support, maintenance and enhancement services provided under the AASHTO license agreement and license fee structure for SafetyAnalyst. Choosing this special offering is strictly the prerogative of the agency. AASHTO shall serve as facilitator only by accepting the commitment for such contractor-provided services, invoice and receive payment on behalf of the agency and forward the order and payment to the contractor for the appropriate number of units of services ordered.

Further, AASHTO assumes no responsibility or liability for scheduling or delivery of such units of service. It shall remain the responsibility of the subscribing agency to schedule their individual unit(s) of service directly with the contractor.

Service Unit Work Options

Service units are intended to provide consultation and support to assist the licensee in the implementation of the SafetyAnalyst product, and may include the following types of activities, or work by the contractor(s):

- Preparing and importing the required roadway inventory, crash report and traffic volume data;

- Specialized training in the use of SafetyAnalyst;

- Agency specific modifications or customized reports and data exporting; and

- Agency specific enhancements to SafetyAnalyst modules.

In general, Service Units should not be used for work involving major new software development by member agencies. Service Units may be converted to provide additional enhancement funding under the guidance of the Task Force.

To ensure that ownership issues are resolved, significant development work related to AASHTOWare products and enhancement requests utilizing service units should be reviewed by the Task Force prior to the work being performed. The use of Service Units to perform modifications that change AASHTO product source code must be reviewed and approved by the Task Force. Service units may not be used to provide reimbursement for travel expenses by agency personnel.

Fee for Service Units

This service is offered and can be ordered in unit increments of $8,300.00, which cannot be prorated and shall be paid upon receipt of the invoice. This fee includes the AASHTO administrative costs. Each service unit provides $7,422.00 in MRI contractor services or $7,100.00 in ITT contractor services.

Additional Funding for Development/Enhancement Items

The SafetyAnalyst Task Force recognizes that some member agencies might desire certain additional development or may desire to accelerate development of a SafetyAnalyst optional component(s), and may be in a position to fund such development. In fact, the practice of individual and/or groups of member agencies funding specific development/enhancement work through AASHTO's contracts with its software service providers has long been an acceptable means of accomplishing such work.

Process for Funding Additional Enhancements

Any member department, or group of member departments that desires to fund development/enhancement work for one or more SafetyAnalyst modules that will not be addressed in our current work plan(s) should follow the process outlined below:

- Submit a request to the SafetyAnalyst Task Force describing the desired enhancement(s) with a work plan indicating the expected contractor's cost and schedule associated with performing the work. This request should also indicate which member departments are considering or are prepared to fund the additional enhancement work, as well as an indication of how incorporating the desired enhancement will benefit the AASHTO community of users as a whole.

- The SafetyAnalyst Task Force will review and act on the request. If approved, the requesting member agency or agencies will be notified of the total cost to accomplish the desired enhancement activity, including AASHTO administrative expenses. If not approved, the requesting agencies will be notified of the determination made by the Task Force and the reason for denial.

- The requesting agency or agencies should submit written funding commitment to AASHTO, attention Vicki Schofield, SafetyAnalyst Project Manager, along with instructions for billing, that is, individual and address to send appropriate invoice(s).

- Upon receipt of sufficient commitment(s) for funding, AASHTO will begin the process to initiate a new contract or to approve and execute a contract modification to incorporate the approved enhancement activities.

Contact Information

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