AASHTOWare®

Program Highlights

September 2018

A suite of transportation software products developed, supported, maintained, and enhanced through the joint efforts of subject matter experts from AASHTO member agencies, at substantially lower cost than custom, individual development.

PROJECT

AASHTOWare Project™ is web-based software that provides a comprehensive series of software modules designed to address phases in the construction lifecycle beginning with project definition, followed by cost estimation, the bidding/letting process, and construction and materials management. The software is built on a unified database that allows for easy access to data for use in decision-making, reporting, and tracking of various information (i.e. historical bid prices, civil rights and labor management, etc.).

AASHTOWare Project 4.1 was released in August 2018. Attendees of the Project Users Group (PUG) conference, the week of September 30 in Louisville, Kentucky, will be able to get hands on experience with the new enhancements, maintenance fixes, and warranty fixes in the web-based AASHTOWare Project software.

An effort was just completed to deliver initial AASHTOWare Project Data Analytics™ core functionality for line item profiles and bid evaluation analysis in a Software-as-a-Service (SaaS) production release in August 2018. The software is being built to allow users across all departments to analyze the vast array of data within the AASHTOWare Project™ unified database to find patterns, draw conclusions, and most importantly, make better decisions.

AASHTO recently released a solicitation requesting funding to support the full AASHTOWare Project Data Analytics work plan for the continued development of AASHTOWare Project™ BAMS/DSS features, along with new functionality not found in the legacy system, in the web-based and SaaS platforms. Participating agencies will have input into the requirements definition and exclusive access to test the new software in hosted SaaS environments using their own data through the duration of the project. The solicitation response deadline is September 28, 2018.

The Task Force continues to explore mobile app development. A materials sampling and testing mobile application pilot project wrapped in August 2018, with the help of field users from three state agencies. The next goal is to develop a production version of the mobile application for 2019.

"Twenty plus years of development, maintenance, support and enhancement; AASHTOWare Project has delivered high value in the project lifecycle from project inception, award, oversight and analysis to contract completion and everything in between while keeping pace with technology and the functional needs of our agencies."

– Todd Bergland, Manager Technology Support Group, Minnesota DOT

The **AASHTOWare Bridge Design & Bridge Rating™** software provides significant capabilities and features, including support for 3D analysis for multi-girder curved super-structures; LRFR for non-standard gage analysis; adjacent vehicle rating, reinforced concrete slab system structure definition; specification checking and rating of steel diaphragms and lateral bracing; load factor rating of reinforced concrete and post-tensioned multi-cell box beams; and nonstandard gage vehicle analysis of floor system superstructures composed of girders, floor beams, and stringers.

The current release includes features and capabilities from the LRFD Specification updates (8th Edition), the AASHTO *Manual for Bridge Evaluation Specification* updates (3rd Edition), and the incorporation of emergency vehicles into the standard library. Three standalone tools—load rating, prestressed concrete design, and regression comparison—are also delivered with the software.

The AASHTOWare Bridge Task Force is focused on providing improved LRFD and LRFR tools. At the core of the improvements is the modernization of the software architecture to support the desired outcome and include the following enhancements:

- Significantly upgraded core technology to better utilize current and future hardware, and the latest software development technologies.
- Improved analysis performance through use of multi-threading capabilities and parallel task libraries inherent in new processors.
- Improved and simplified the user interface.
- Improved reporting capabilities.
- Reduced maintenance costs and implementation time.

The August 2018 release of the modernized product, 6.8.3, includes the modernized analysis engine and the legacy analysis engine, allowing users to run both engines and compare results with the Regression Testing Tool.

The **AASHTOWare Bridge Management™** software provides a systematic procedure for the allocation of resources to the preservation and improvement of the bridges in a network by considering both the costs and benefits of maintenance policies versus investments in improvements or replacements.

AASHTOWare Bridge Management 6.0 was released in August 2018 with the following key features:

- "Patchable" version
- Mapping Feature Enhancements to reference more precise latitude and longitude values
- NBE Import for the National Bridge Elements from the NBE file submitted to the FHWA
- Improved Export for all screen lists and graphs
- Improved Reports

AASHTOWare Safety Analyst™ incorporates the *Highway Safety Manual (HSM)* safety management approaches into a computerized analytical tool for guiding the decision-making process for programming site-specific highway safety improvements. The software has the capability to identify accident patterns at specific locations and determine whether those accident types are overrepresented and determine the frequency and percentage of particular accident types along specified portions of the highway system. These capabilities can be used to investigate the possible need for enforcement and public education efforts in an area, in addition to identifying potential engineering improvements at a site.

Collection, analysis and improvement of safety data is identified as an eligible project under the Federal Highway Safety Improvement Performance Program. To that end, **Safety Analyst™** is a tool to help implement safety improvements and agencies can use their HSIP funds to license it. Here are some features:
- Helps with maximizing HSIP safety benefits and cost-effectiveness.
- Assists with identifying, prioritizing, and evaluating site-specific and systemic countermeasure improvement projects.
- Provides significant time savings by using software algorithms to automate network screening and complex calculations.
- Computerized analytical tools that incorporate safety management techniques from the AASHTO HSM.
- Standard safety database structure.
- Does not require statistical expertise.

Recent enhancements to **AASHTOWare Safety Analyst 5.1** include:

- Alternate Safety Performance Function (SPF) Functional Forms - Safety Analyst now supports alternative SPF functional forms. The enhanced tools accommodates any alternative SPF functional forms that highway agencies wish to use, as long as the SPF has a multiplicative exponential form consisting of constant terms, exponential terms with a constant exponent, exponential terms with a variable exponent, and power terms.

- Performance Monitoring Reports - The Performance Monitoring Reports enhancement provides a capability to the users of Safety Analyst to monitor the overall safety performance of an agency's highway network or any subset of its highway network. The reports provide results that document the safety performance during specified years or that allow an agency to make year-to-year comparisons in performance.

Future initiatives include:

- Functional specification to update and improve **Safety Analyst™** output reports.
- Functional specification predictive component of network screening for corridors to introduce predicted.
- Crash frequencies.
- An improved crash diagram tool.
- A data quality review tool.

AASHTOWare Pavement ME Design™ incorporates the mechanistic-empirical pavement design guide and is a production-ready software tool to support the day-to-day operations of public and private pavement engineers. It provides tools to generate optimized pavement design based on given requirements and provides extensive reports to evaluate and fine-tune the design. The software supports Citrix® and remote desktop services.

Pavement ME Design 2.5 includes the following enhancements:

- Manual of Practice Integration
- Modulus API – to work directly with the modulus analysis module in Pavement ME Design.
- MasterTCModel File API - provides researchers with programmatic access to the thermal cracking outputs in Pavement ME Design.
- Report Customization- Users may now customize their output report based on performance criteria.
- Enhanced Project Comparison
- Maintenance Strategy Tool
- Integration of MERRA Climate Data for Flexible Pavements
- Transliteration of Analysis Executables to C# - All FORTRAN and C++ code in the analysis engine has been converted to C#. Major step toward creating a viable web application.
- Tensile Strength for Level 1 Inputs – now available in the user interface for entering tensile strength data.
- Recalibration - New flexible and flexible rehab pavement designs (including semi-rigid) have undergone recalibration as a result of the technical audit changes and the new MERRA-2 climate data set.

A major future initiative in FY 2019 is the recalibration of flexible and semi-rigid transfer functions. The objective of this effort will be to verify and update the global calibration coefficients of the flexible and semi-rigid pavement transfer function coefficients. The global calibration will be completed in accordance with the AASHTO Guide for the Local Calibration of the Mechanistic-Empirical Pavement Design Guide, dated November 2010.

"The AASHTO Pavement ME Design software continues to evolve in a way that addresses current transportation agency needs. In particular, the recent additions of a thin asphalt overlay reflection cracking model and a bonded concrete on asphalt design procedure provide solutions for rehabilitating and maintaining existing infrastructure."

– John P. Donahue, Construction and Materials Liaison Engineer, Missouri DOT