

## ACCEPTED COMMERCIALY AVAILABLE OR CONSULTANT DEVELOPED SOFTWARE

(UPDATED AUGUST 15, 2019)

### Recent Updates:

- 8/15/2019 - Accepted SLIDE2, v2018 (Rocscience Inc.) for slope stability analysis
- 7/25/2019 - Accepted Eriksson Pipe (Eriksson Software, Inc.) for buried precast concrete pipe design and analysis. *[supersedes and replaces PIPECAR (FHWA)]*
- 4/16/2019 - Accepted Midas Civil 2019, v2.2 (MIDAS Information Technology Co., Ltd.) for Load Factor Ratings and for LRFD design, analysis and rating.

The software and programs listed herein have been tested and accepted for use on Department projects as indicated. Unless noted otherwise, only the listed version of a program, if given, has been tested and accepted. The following content had previously been provided in Appendix J of Design Manual, Part 4.

### 3D AND REFINED METHODS OF ANALYSIS

Listed below are computer programs accepted for 3D or Refined Analysis to determine Load Factor Ratings (LFR) and for LRFD analysis and ratings. The acceptance of these programs is subject to the following conditions and limitations:

1. While certain software packages provide design optimization and/or code compliance checks, these aspects were not included in the review process. Acceptance has been based solely upon the review of generalized design forces (moments, shears, reactions, etc.) as calculated by the software.
2. Acceptance of a software package by the Department does not affect the responsibility of the designer for the proper application of the software and interpretation of its results. The acceptance of a software package does not constitute an endorsement, nor does it relieve the vendor or the designer from their responsibility for accurate, technically correct, and sound engineering results and services to the Department.
3. The Department's acceptance does not constitute any form of implied warranty, including warranty of merchantability and fitness for a particular purpose. The Commonwealth makes no warranty or representation, either expressed or implied, with respect to this software or accompanying documentation, including their quality performance, merchantability, or fitness for a particular purpose. In addition, the Commonwealth will not be liable for any direct, indirect, special, incidental, or consequential damages arising out of the use, inability to use, or any defect in the software or any accompanying documentation.

Only the version of a program listed in the tables below has been tested and accepted. If any changes and/or modifications are made to a program after its acceptance date, re-evaluation and acceptance of the program is required.

### Load Factor Ratings (LFR)

ACCEPTED SOFTWARE	VENDOR / CONSULTANT	ACCEPTED
AASHTOWare Bridge Design and Rating, v6.6.0	AASHTO (Washington, D.C.)	6/16/2014
BSMStudio, v1.5	Fynite Solutions, LLC (Moon Township, PA)	12/22/2014
CSiBridge, 2015, v16 through v21 *	Computers & Structures, Inc. (Walnut Creek, CA)	8/21/2014
LARSA 4D Bridge, v7.08.05 *	LARSA, Inc. (Melville, NY)	7/28/2016
LEAP Bridge Steel, CONNECT Edition, * v16 and v17	Bentley Systems, Inc. (Exton, PA)	4/20/2016
LOAD3D v2.0	SAI Consulting Engineers, Inc. (Pittsburgh, PA)	7/26/2017
LUSAS+VLO v15.0 (Vehicle Load Opt.) *	LUSAS (New York, NY)	12/31/2014
Midas Civil 2019, v2.2 *	MIDAS Information Technology Co., Ltd.	4/16/2019

\* Consultants utilizing these programs will need to submit sample calculations that demonstrate their proficiency with the software to properly perform a 3D finite element structural analysis including moving loads, influence surface generation, and subsequent design code checks.

### LRFD Analysis and Rating

ACCEPTED SOFTWARE	VENDOR / CONSULTANT	ACCEPTED
AASHTOWare Bridge Design and Rating, v6.6.0	AASHTO (Washington, D.C.)	12/3/2014
BSMStudio, v1.5	Fynite Solutions, LLC (Moon Township, PA)	12/31/2014
CSiBridge, 2015, v16 through v21*	Computers & Structures, Inc. (Walnut Creek, CA)	12/2/2014
LARSA 4D Bridge, v7.08.05 *	LARSA, Inc. (Melville, NY)	2/15/2017
LEAP Bridge Steel, CONNECT Edition, * v16 and v17	Bentley Systems, Inc. (Exton, PA)	5/19/2016
LOAD3D v2.0	SAI Consulting Engineers, Inc. (Pittsburgh, PA)	7/27/2017
LUSAS+VLO v15.0 (Vehicle Load Opt.) *	LUSAS (New York, NY)	11/3/2015
Midas Civil 2019, v2.2 *	MIDAS Information Technology Co., Ltd.	4/16/2019

\* Consultants utilizing these programs will need to submit sample calculations that demonstrate their proficiency with the software to properly perform a 3D finite element structural analysis including moving loads, influence surface generation, and subsequent design code checks.

## **GENERAL PURPOSE STRUCTURAL ANALYSIS**

- STAAD.Pro V8i (Bentley Systems, Inc.)

The following features have not yet proven satisfactory to the Department and shall not be used:

1. The analysis of moving live loads on two- or three-dimensional structural models, load rating determination, and all design code check capabilities.
2. The response spectrum and forced vibration analysis capabilities, or seismic design and analyses.

- LUSAS v15.0 (without Vehicle Load Optimization) (LUSAS)

The following features have not yet proven satisfactory to the Department and shall not be used:

1. The analyses of LRFD moving live loads on two- or three-dimensional structural models, load rating determination, and all design code check capabilities.
2. The response spectrum and forced vibration analysis capabilities, or seismic design and analyses.
3. Analyses involving the non-linear behavior of material properties.

- BSMStudio (Fynite Solutions, LLC)

The following features have not yet proven satisfactory to the Department and shall not be used:

1. All design code check capabilities.
2. The response spectrum and forced vibration analysis capabilities, or seismic design and analyses.

- SAP2000 v19.1.0 (Computers and Structures, Inc.) *[Accepted 5/3/2017]*

The following features have not yet proven satisfactory to the Department and shall not be used:

1. The analyses of LRFD moving live loads on two- or three-dimensional structural models, load rating determination, and all design code check capabilities.
2. The response spectrum and forced vibration analysis capabilities, or seismic design and analyses.
3. Analyses involving the non-linear behavior of material properties.

- RFEM v5.13.01 (Dlubal Software, Inc.) *[Accepted 4/19/2018]*

The following features have not yet proven satisfactory to the Department and shall not be used:

1. The analyses of LRFD moving live loads on two- or three-dimensional structural models, load rating determination, and all design code check capabilities.
2. The response spectrum and forced vibration analysis capabilities, or seismic design and analyses.

## **PIER ANALYSIS**

- VBent v3.4.0 (Viathor, Inc.)

## **BURIED PRECAST CONCRETE PIPE DESIGN AND ANALYSIS**

- Eriksson Pipe (Eriksson Software, Inc.) *[supersedes and replaces PIPECAR (FHWA)]*

## **SEISMIC DESIGN AND ANALYSIS OF GIRDER BRIDGES**

- WinSEISAB v5.1.0 (TRC Software LLC)

## **GEOTECHNICAL DESIGN AND ANALYSIS**

### **Pile Hammer WEAP Analysis (refer to DM-4 Article 10.7.3.8.4aP)**

- GRLWEAP 2010 (Pile Dynamics, Inc.)

### **Ultimate Vertical Static Pile Capacity (refer to FHWA Report SA-98-074, AASHTO Article 10.7.3.8.6 and DM-4 Article 10.7.3.8.6)**

- DRIVEN v1.2 (FHWA)
- AllPile (CivilTech Software)

### **Laterally Loaded Piles and Drilled Shafts (refer to DM-4 Article 10.7.3.12.2P)**

- COM624P (Ensoft, Inc.)
- LPILE (Ensoft, Inc.)

### **Slope Stability Analysis (refer to PennDOT Pub. 293 and DM-4 Article 10.6.2.5)**

- SLIDE v7.0 through SLIDE2 v2018 (Rocscience Inc.)

## **INQUIRIES AND SUBMISSIONS**

For more information about software acceptance and pre-qualification for utilizing software, or to make a submission and initiate the acceptance review process, please contact:

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