Index Table

Bridge Software Institute
University of Florida
PO Box 116580
Gainesville, FL 32611

Online: bsi.ce.ufl.edu
Email: bsi@ce.ufl.edu
Fax: (352) 392-3697

BSI Bridge Software Institute NEWSLETTER

In this issue, we discuss recently developed features in FB-MultiPier v5.1.1. The main item of discussion showcases how to model pile bents in a manner that promotes numerical stability. Additionally, streamlined post-processing enhancements are presented for the Design Tables and 3D Results features.

The newsletter features Technical Corner and Discussions are open for input from all readers. If you have a topic that you would like to see discussed, let us know. Did you create a great model with features that you want to share? Users of BSI software are welcome to submit articles for possible inclusion in subsequent issues.

Please contact BSI at **BSI@ce.ufl.edu** with your ideas.

SUMMER
2017

Index Table

Bridge Software Institute
University of Florida
PO Box 116580
Gainesville, FL 32611

Online: bsi.ce.ufl.edu
Email: bsi@ce.ufl.edu
Fax: (352) 392-3697

What's New at BSI

We are pleased to announce the release of FB-MultiPier v5.1.1. This program and other structural analysis software are available for download from the **BSI** website. The new version of FB-MultiPier contains fixes to the latest reported errors and also includes a number of new features.

Technical Corner

Pile Bent Design

We encounter frequent questions about how one might consider the pile bent model where pinned pile heads cause instability for rotation about the long axis (Xp) of the bent cap. The Problem Type "Pile Bent" in FBMP allows for a single row of piles, with all piles located along the same axis. Some strategies have been taken by our clients and some suggested by BSI in dealing with this issue:

1) Pin the pile heads but do not apply loadings that create torque about the cap. Consider that longitudinal braking and wind on LL are often considered to be resisted by force couples in a bridge acting to create vertical forces at the bents. The shears can be applied to the bearings which lie on the centerline of the cap and therefore will not create torque in the cap.

2) Create a pile section at the pile head that replicates the strength interaction assumed to exist considering the embedment. Please refer to our Fall 2009 Newsletter "Pile to Cap Connection" (https://bsi.ce.ufl.edu/newsletter/newsletter_F09.html).

3) Use the fixed head option and confirm that the pile head moments are indeed greater than the allowed resistance considering the pile embedment. Consider that the pile butt end can resist a substantial bending moment assuming enough compressive axial force exists so that tensile stresses are not developed.

Index Table

Bridge Software Institute
University of Florida
PO Box 116580
Gainesville, FL 32611

Online: bsi.ce.ufl.edu
Email: bsi@ce.ufl.edu
Fax: (352) 392-3697

Program Enhancements

Modeling Group Axial Soil Resistance

A feature has been added allowing for SEPARATE pile/shaft axial tip and side resistance modifiers (factors). These modifiers reduce the T-Z and Q-Z curves in order to account for group axial effects. The axial and side resistance factors can be input by navigating to the 'Soil' page and selecting the 'Group' button, which opens the 'Pile Group Factors' dialog (**Figure 1)** .

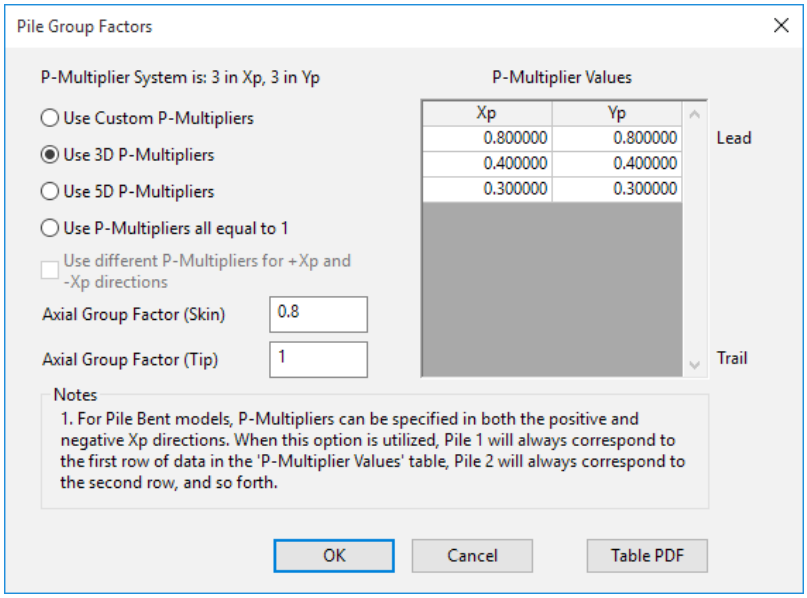

Figure 1. Pile Group Factors Dialog

Index Table

Bridge Software Institute
University of Florida
PO Box 116580
Gainesville, FL 32611

Online: bsi.ce.ufl.edu
Email: bsi@ce.ufl.edu
Fax: (352) 392-3697

Design Tables: Internal Forces at Pile Heads

We have responded to requests for the following features to further streamline the post-processing and reporting of FBMP analysis results:

"*Report all pile head forces for all load cases in tabular form*"

When selecting the "Design Tables" button the Design Table Generator menu is made available, **Figure 2**. A new button "Internal Forces at Pile Heads " has been added and when selected an Excel formatted sheet is created which lists all forces that coexist at every pile head across all load cases, **Figure 3**.

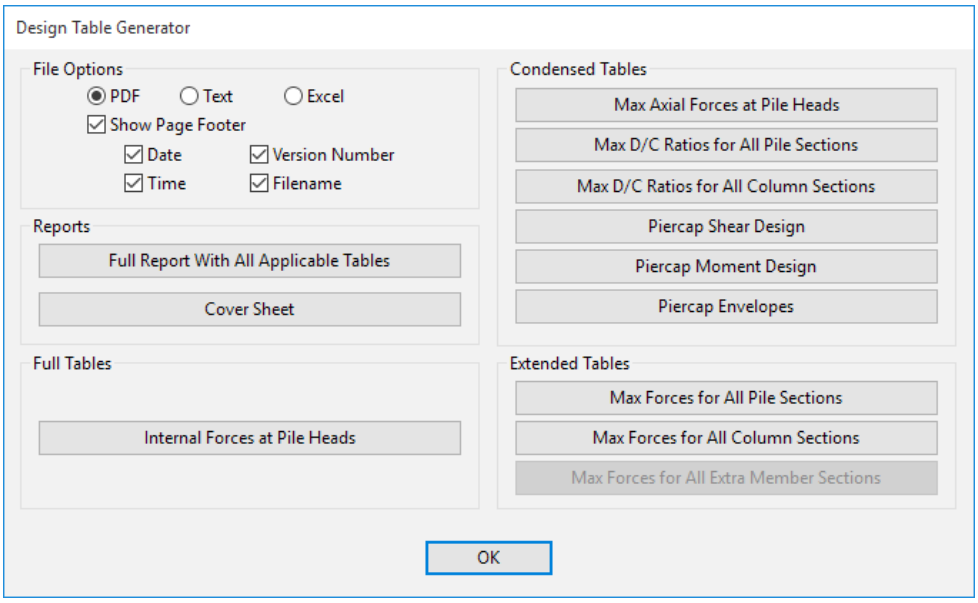

Figure 2. Design Table Dialog

Internal Forces at Pile Heads

PILE NO.	ELEM NO.	NODE NO.	LOAD CASE	LIMIT STATE	FAX (kips)	F22 (kips)	F33 (kips)	M22 (kip-ft)	M33 (kip-ft)	TORQUE (kip-ft)	D/C (ratio)
1	39	1	1	***	-70.06	0.02	-0.04	0.52	1.09	0.00	0.04
2	64	2	1	***	-69.86	0.00	-0.03	0.00	0.97	0.00	0.04
3	89	3	1	***	-70.06	-0.02	-0.04	-0.52	1.09	0.00	0.04
4	114	4	1	***	-70.62	0.02	0.00	0.61	0.00	0.00	0.04
5	139	5	1	***	-70.24	0.00	0.00	0.00	0.00	0.00	0.04
6	164	6	1	***	-70.62	-0.02	0.00	-0.61	0.00	0.00	0.04
7	189	7	1	***	-70.06	0.02	0.04	0.52	-1.09	0.00	0.04
8	214	8	1	***	-69.86	0.00	0.03	0.00	-0.97	0.00	0.04
9	239	9	1	***	-70.06	-0.02	0.04	-0.52	-1.09	0.00	0.04

Figure 3. Internal Forces exported to Excel

Index Table

Bridge Software Institute
University of Florida
PO Box 116580
Gainesville, FL 32611

Online: bsi.ce.ufl.edu
Email: bsi@ce.ufl.edu
Fax: (352) 392-3697

3D Results: Internal Forces and Displacements for Selected Element

"*Report all element forces and displacements in tabulated form*"

Once a structural element has been selected in the 3D Results window a new 'Export' menu button has been introduced that with export this data to Excel as seen in **Figure 5**.

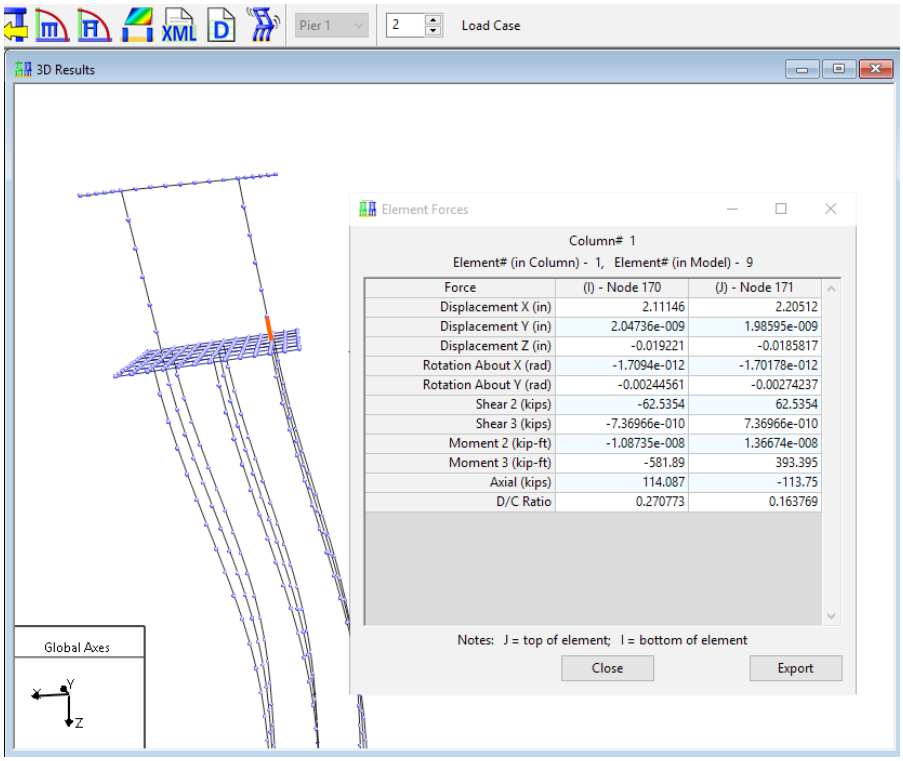

Figure 4. Element Forces dialog from 3D Results window.

Element Forces: Pier 1, Element 9

COLUMN NO.	ELEM NO.	NODE NO.	LOAD CASE	LIMIT STATE	FAX (kips)	F22 (kips)	F33 (kips)	M22 (kip-ft)	M33 (kip-ft)	D/C (Ratio)	DISPX (in)	DISPY (in)	DISPZ (in)	ROTX (rad)	ROTY (rad)
1	9	170	1	***	-1.8206E+02	-1.1810E+01	-4.0000E-10	-7.4316E+01	6.7000E-09	4.4523E-02	4.6025E-04	0.0000E+00	1.4115E-01	0.0000E+00	-2.7766E-05
1	9	170	2	***	-1.1409E+02	-6.2535E+01	-7.0000E-10	-5.8189E+02	-1.0900E-08	2.7077E-01	4.6025E-04	0.0000E+00	1.4115E-01	0.0000E+00	-2.7766E-05

Figure 5. Element Forces exported to Excel

SUMMER
2017

Index Table

Bridge Software Institute
University of Florida
PO Box 116580
Gainesville, FL 32611

Online: bsi.ce.ufl.edu
Email: bsi@ce.ufl.edu
Fax: (352) 392-3697

For Technical Support

Cary Peterson
Technical Support, Bridge Software Institute

Technical support questions: When running an analysis with FB-MultiPier, the input file should always be located on the local machine, and not on a network server. FB-MultiPier creates binary files during the analysis. Binary files are written to and read by FB-MultiPier. If an input file is located on a server, network latency can result in these binary files not being written and read fast enough to keep up with the engine process. This can cause the program to crash during the running of the analysis. Thus, it is best practice to create a folder on the local machine, and save the input file to this location. Once the model has been analyzed, the input (.in) and output (.out) files can be copied back to the server location (for permanent storage, or access by other end users).

When requesting technical support for any BSI software, it is recommended to email the input file (.in file for FB-MultiPier and Atlas or .spc file for FB-Deep) to bsi@ce.ufl.edu along with a brief explanation and any supporting documentation of the issue. This will allow the support staff to provide prompt technical support to our users.

Identifying the program version: It is important that users have the current most up-to-date version of the BSI software. Thus we recommend that users regularly visit the home page of the **BSI** website. To identify the current version of program installed on your computer, open the program and go to Help -> About to see the program version number.

Index Table

Bridge Software Institute
University of Florida
PO Box 116580
Gainesville, FL 32611

Online: bsi.ce.ufl.edu
Email: bsi@ce.ufl.edu
Fax: (352) 392-3697

BSI Program Status

FB-MultiPier v5.1.1 Download a FREE demo today!

Released: June 22, 2017 - Continuing Development - Technical Support Available

FB-MultiPier allows for the modeling of bridges, bridge piers, pile bents, and other foundation structures. In addition to allowing for multiple load cases and AASHTO load combinations, FB-MultiPier is also capable of performing dynamic analysis (time-history and RSA). For more information about FB-MultiPier, click here.

FB-Deep v2.04 Download a FREE demo today!

Released: May 28, 2012 - Continuing Development - Technical Support Available

FB-Deep is used to estimate the static axial capacity of drilled shafts and driven piles. The methodology is based upon Federal Highway Administration (FHWA) reports. FB-Deep guides the user through pile and shaft materials data, shape and dimensional inputs, soil properties, and boring log info. For more information about FB-Deep, click here.

Atlas v7.0

Released: June 13, 2017 - Limited Web Support Available

Atlas is a finite element analysis program that is used for the design/analysis of cable supported traffic signal systems. The Atlas program models dual cable supported systems including single-point, and two-point attachments systems. For more information about Atlas, click here.

Index Table

Contact BSI

If you need to contact BSI for any reason you can use any of the methods below:
Online: bsi.ce.ufl.edu
Email: bsi@ce.ufl.edu
Fax: (352) 392-3697

Mailing Address:

Bridge Software Institute
University of Florida
PO Box 116580
Gainesville, FL 32611