

Brian L Goodrich, PE

BridgeTech, Inc.
2232 Dell Range Blvd, Suite 245-3672
Cheyenne, WY 82009
307.222.4688
brian.goodrich@bridgetechwyo.com

Professional Registration

Structural Engineering, Wyoming Registration Number: 12358

Education

MS Civil Engineering (Structural Emphasis)
University of Wyoming, Laramie, WY; May 1999
BS Architectural Engineering (Structural Emphasis)
University of Wyoming, Laramie, WY; May 1995

General Qualifications

Mr. Goodrich is a principal programming engineer and:

- Maintains and enhances WYDOT's BRASS-GIRDER™, BRASS-GIRDER(LRFD)™, BRASS-GIRDER(STD), BRASS-ROUTE™, BRASS-DIST™, BRASS-PAD™, BRASS-POLE™, BRASS-SPLICE™, BRASS-TRUSS™, BRASS™ Library Utility, and the BRASS™ integration with AASHTOWare Bridge Design and Rating (ASD/LFD/LRFD/LRFR).
- Assists with maintaining and enhancing WYDOT's BRASS-CULVERT™, BRASS-PIER™, and BRASS-PIER(LRFD)™.
- Implemented and maintained AASHTO LRFR in BRASS-GIRDER™ and performed parametric comparisons to load factor ratings.
- Has extensive experience in the application of AASHTO specifications and several specification changes have been motivated by his work in LRFD and LRFR.
- Attends and participates in AASHTOWare Bridge Design and Rating (formerly Virtis®/Opis®) User Group meetings.
- Has taught many short courses on bridge analysis software and application of LRFD.
- Was an investigator in NCHRP 12-50 and 12-62 and played a critical role on those projects.

Experience

BridgeTech, Inc., Laramie, WY

Co-owner, President (September 2019 – Present)
Senior Programming Engineer III (January 2012 – Present)
Senior Programming Engineer I (September 2000 – December 2011)
Programming Engineer IV (July 1999 – August 2000)
Programming Engineer (June 1995 – June 1999)
Student Engineer (Part-time) (May 1994 – May 1995)

- Developing/maintaining/enhancing bridge engineering software.
 - **BRASS-GIRDER™ Engine** (using Fortran), which analyzes and rates a bridge girder-line using the AASHTO LRFD *Bridge Design Specifications* and the *Manual for Bridge Evaluation*. Developing subroutines that interpret input commands, perform cross-section analysis, perform structural analysis, perform specification checks, compute design ratios and rating factors, and output results.
 - **BRASS™ Engines** (using Fortran) for Wyoming Department of Transportation's Girder, Girder(LRFD), Girder(STD), Culvert, Distribution, Route, Library Utility, and Truss applications.
 - **BRASS™ Export Module** (using Microsoft C++), which passes data to BRASS-GIRDER™ or generates a BRASS-GIRDER(LRFD)™/BRASS-GIRDER(STD) data file from the AASHTOWare Bridge Rating and Design bridge definition. Developing objects to make the abstraction from the bridge definition to the mathematical model.
 - **BRASS™ Import Utility** (using Microsoft C++), which imports BRASS-GIRDER(LRFD)™/BRASS-GIRDER(STD) data files into the AASHTOWare Bridge Design and Rating database. Developing objects to convert the mathematical model to the bridge definition.
 - **Next Generation BRASS™ User Interfaces** (using Microsoft C++ and .NET) for Wyoming Department of Transportation's Girder analysis, Culvert analysis, Route analysis, Distribution analysis, and Library Utility applications.
 - **BRASS™ User Interfaces** (using Microsoft C++ and MFC) for Wyoming Department of Transportation's Pier(LRFD) application. Developing graphical display that links directly to input dialog fields. Implementing 3rd party plotting tool and grid control.
 - **BRASS™ User Interfaces** (using Visual Basic, C++, and .NET) for Wyoming Department of Transportation's Pad, Pole, and Splice applications.
 - **BRASS™ User Interfaces** (using Borland C++) for Wyoming Department of Transportation's Girder(STD), Girder(LRFD), Pier, and Truss applications.
 - **BRASS™ Help Systems** for Wyoming Department of Transportation's Culvert, Girder, Girder(STD), Girder(LRFD), Pad, Pier, Pier(LRFD), Pole, Splice, Distribution, Route, and Library Utility applications.
 - **BRASS™ Installations** (using NSIS) for Wyoming Department of Transportation's BRASS™ Suite of programs.
- Developing bridge software validation process, as member of team of *NCHRP Project 12-50*. Implementing process in BRASS-GIRDER(LRFD)™ and BRASS-GIRDER™ engines.
- Implementing Load and Resistance Factor Rating (LRFR) specification from *NCHRP Project 12-46* in BRASS-GIRDER(LRFD)™ engine. Comparing Load Factor Rating (LFR) to LRFR results for numerous steel, reinforced concrete, and prestress concrete bridges and determining trends. Study is relevant to national policy development associated with the long-term adoption of this new specification.
- Instructing bridge engineers (from state DOTs and consulting firms) on the use of AASHTOWare Bridge Design and Rating (formerly Virtis®/Opis®) and WYDOT's BRASS-GIRDER™, BRASS-GIRDER(LRFD)™, and BRASS-GIRDER(STD) programs.
- Developing/giving presentations on philosophy and progress of the BRASS-GIRDER™, BRASS-GIRDER(LRFD)™, and BRASS-GIRDER(STD) programs at annual BRASS™ Users' Group meetings and AASHTOWare Bridge Design and Rating User Group meetings.

- Developing/maintaining database applications.
 - **BT-POST** application (using Microsoft Access), which imports several related tables containing x-y plot data and detailed computations for cross section analysis, specification checks, etc. Creating queries to sort the data and forms to navigate through and display the queried data. Creating forms with graphs to view plots of the x-y data. AASHTO Opis® application utilized this concept for displaying results.
 - **Visual Bridge** application (using Microsoft Access), which collects data about a bridge in a general manner, produces a BRASS-GIRDER™ input data set, and runs the BRASS-GIRDER™ program. Visual Bridge was used as a starting point for the initial AASHTO Virtis® application.
 - **BridgeTech Time Log** (using Microsoft Access), which tracks dates, times, and descriptions of tasks, reimbursement, and mileage. Designing associated forms for inputting information and reports for printing.

Skills

- C#/C++/Fortran/Visual Basic/VBA Programming
- C#/C++/Visual Basic Windows Programming in .NET
- C++ Windows Programming with MFC
- Estimating Programming Development
- Technical Writing
- Help System Development
- Installation Development
- Database Application Development
- Website Development Using Joomla

Professional Organizations

American Society of Civil Engineers

Publications

Barker, M.G., **Goodrich, B.L.**, Jablin, M.C., and Puckett, J.A., "Assessment and Evaluations of I-80 Truck Loads and Their Load Effects: Phase 2: Service," United States Department of Transportation, National Transportation Library, April 2020.

Goodrich, B.L., Puckett, J.A., Jablin, M.C., "Validation of Specification Modification via NCHRP 12-50 Process," International Bridge Engineering Conference, TRB: 61BECS-108, July 2005, in press.

Goodrich, B.L., "Export Challenges," Virtis/Opis Newsletter, Vol. 7, p. 8, June 2003.

Goodrich, B.L. and Puckett, J.A., "Comparison of LFR and LRFR Bridges," National Concrete Bridge Conference, National Concrete Bridge Association, Nashville, TN, October 2002.

Goodrich, B.L. and Puckett, J.A., "Simplified Load Distribution for Vehicles with Nonstandard Axle Gages," Transportation Research Record, Journal of the Transportation Research Board, No. 1696, Vol. 2, pp. 158-170, April 2000.

Mlynarski, M., et al, "Bridge Software Validation Guidelines and Examples," Transportation Research Record, Journal of the Transportation Research Board, No. 1696, Vol. 1, pp. 143-151, April 2000.

Goodrich, B.L., "Simplified Method for Determining Live Load Distribution Factors for Overweight Vehicles with Non-Standard Axle Configurations," M.S. thesis, University of Wyoming, Laramie, WY, 1999.

Goodrich, B.L. and Puckett, J.A., "Rating Factor Computations for Shear-Moment Interaction Using AASHTO LRFD," ASCE Bridge Journal, Practitioner's Forum, October 1998.

Presentations

Goodrich, B.L. and Puckett, J.A., "BRASS™ Update," Virtis/Opis Users' Group Meeting, Niagara Falls, NY, July 2012.

Puckett, J.A. and Goodrich, B.L., "BRASS™ for Virtis®/Opis® Users," Virtis/Opis/BRASS Users' Group Meeting, St. Louis, MO, August 2006.

Goodrich, B.L. and Puckett, J.A., "BRASS™ Engine/GUI Merger and the Effects on Virtis®/Opis®," Virtis/Opis/BRASS Users' Group Meeting, St. Louis, MO, August 2006.

Puckett, J.A. and Goodrich, B.L., "BRASS™ for Virtis®/Opis® Users," Virtis/Opis/BRASS Users' Group Meeting, Baltimore, MD, August 2005.

Goodrich, B.L. and Watters, M., "Wyoming DOT BRASS™ Merger," Virtis/Opis/BRASS Users' Group Meeting, Baltimore, MD, August 2005.

Puckett, J.A. and Goodrich, B.L., "Merger of BRASS™ Standard Specification Program with LRFD Program," Virtis/Opis/BRASS Users' Group Meeting, Burlington, VT, July 2004.

Goodrich, B.L., Puckett, J.A., and Peavy, M.D., "BRASS™ UI Development," Virtis/Opis/BRASS Users' Group Meeting, Burlington, VT, July 2004.

Goodrich, B.L., "BRASS-GIRDER(LRFD)™ Prestressed Concrete Examples," Virtis/Opis/BRASS Users' Group Meeting, Burlington, VT, July 2004.

Goodrich, B.L., Puckett, J.A., and Jablin, M.C., "BRASS™ UI Development," Virtis/Opis/BRASS Users' Group Meeting, Gulf Shores, AL, August 2003.

Goodrich, B.L., Puckett, J.A., and Jablin, M.C., "Comparison of LFR and LRFR Methods for Bridges," Virtis/Opis/BRASS Users' Group Meeting, Gulf Shores, AL, August 2003.

Goodrich, B.L., Puckett, J.A., and Jablin, M.C., "Comparison of LFR and LRFR Methods for Bridges," AASHTO 2003 Subcommittee on Bridges and Structures Annual Meeting, T-18 Committee, Albuquerque, NM, June 2003.

Goodrich, B.L., Puckett, J.A., and Jablin, M.C., "Implementation of AASHTO LRFD 6.10 Revisions," AASHTO 2003 Subcommittee on Bridges and Structures Annual Meeting, T-14 Committee, Albuquerque, NM, June 2003.

Goodrich, B.L., Puckett, J.A., and Jablin, M.C., "Comparison of LFR and LRFR Methods for Bridges," Annual Structural Engineering Conference, University of Illinois at Urbana-Champaign, Urbana, IL, April 2003.

Puckett, J.A. and Goodrich, B.L., "BRASS-PIER(LRFD) Update and Demonstration," BRASS/Virtis/Opis Users' Group Meeting, Lincoln, NE, August 2002.

Goodrich, B.L., "BRASS-GIRDER(LRFD) Update," BRASS/Virtis/Opis Users' Group Meeting, Albuquerque, NM, August 2001.

Goodrich, B.L. and Puckett, J.A., "BRASS-GIRDER(LRFD) Update," BRASS/Virtis/Opis Users' Group Meeting, Minneapolis, MN, July 2000.

Jablin, M., Goodrich, B.L. and Puckett, J.A., "BRASS-PIER(LFD and LRFD) Maintenance and Development Efforts," BRASS/Virtis/Opis Users' Group Meeting, Minneapolis, MN, July 2000.

Goodrich, B.L., "Recent Modifications and Enhancements to BRASS-GIRDER(LRFD)," BRASS/Virtis/Opis Users' Group Meeting, Nashville, TN, July 1999.

Goodrich, B.L., Cole, A.P. and Puckett, J.A., "BRASS-Culvert Administrative Update and Demonstration," BRASS and AASHTO Virtis/Opis Users' Group Meeting, Nashville, TN, July 1999.

Goodrich, B.L. and Puckett, Jay A., "AASHTO Funded Enhancements to BRASS," BRASS/Virtis/Opis Users' Group Meeting, Kansas City, MO, July 1998.

Puckett, J.A. and Goodrich, B.L., "Update on BRASS Culvert with Emphasis on the GUI," BRASS/Virtis/Opis Users' Group Meeting, Kansas City, KC, July 1998.

Goodrich, B.L., "BRASS-GIRDER(LRFD) Testing," BRASS/Virtis/Opis Users' Group Meeting, Kansas City, MO, July 1998.

Goodrich, B.L. and Puckett, J.A., "Overview of a Simplified Method for Permit Vehicles with Non-Standard Gage Widths," BRASS/Virtis/Opis Users' Group Meeting, Kansas City, MO, July 1998.

Puckett, J.A. and Goodrich, B.L., "Introduction to the Capabilities of BRASS LRFD," Software For AASHTO LRFD Bridge Specifications, International Bridge Conference, Pittsburgh, PA, June 1998.

Puckett, J.A. and Goodrich, B.L., "BRASS-Culvert Update," AASHTO Subcommittee on Bridges, Annual Meeting, Nashville, TN, May 1998.

Puckett, J.A. and Goodrich, B.L., "Live Load Distribution for Permit Vehicles with Non-Standard Axle Configurations Using AASHTO LRFD Distribution Factors," AASHTO Subcommittee on Bridges, Annual Meeting, Nashville, TN, May 1998.

Goodrich, B.L. and Puckett, J.A., LRFD Software Panel, Kansas DOT Bridge Engineering Seminar, Kansas State University, Manhattan, KS, October 1997.

Puckett, J.A. and Goodrich, B.L., BRASS-LRFD Capabilities and Future Linkages, Western Bridge Engineers' Seminar, Coeur d' Alene, ID, October 1997.

Goodrich, B.L. and Puckett, J.A., "BRASS LRFD Example Problems," BRASS Users' Group Meeting, Albany, NY, July 1997.

Puckett, J.A. and Goodrich, B.L., "Update on BRASS-LRFD," BRASS Users' Group Meeting, Albany, NY, July 1997.

Puckett, J.A. and Goodrich, B.L., "Update on BRASS-LRFD," AASHTO Committee on Bridges, Technical Committee Meeting, T19, Jackson, WY, June 1997.

Puckett, J.A. and Goodrich, B.L., "LRFD Update BRASS-GIRDER," BRASS Users' Group Meeting, Boise, ID, July 1996.

Puckett, J.A. and Goodrich, B.L., "Update on BRASS Family of Programs," BRASS Users' Group Meeting, Boise, ID, July 1996.

Continuing Education - Instructor

"BRASS™ Training," U.S. Department of the Interior - Bureau of Indian Affairs, Bloomington, MN, January 9-12, 2023.

"BRASS™ Training," U.S. Department of Agriculture - Forest Service, Virtual Workshop, April 27-29 and May 11-13, 2021.

"BRASS-GIRDER™ 8.0 Training," U.S. Department of Agriculture - Forest Service, Springfield, OR, November 15-16, 2017.

"Introduction to AASHTOWare Virtis 6.3 -- A Two-day Short Course," Army Corp of Engineers, Vicksburg, MS, January 31 - February 1, 2012.

"Introduction to AASHTOWare Opis 6.0 -- A Two-day Short Course," Alabama DOT, Montgomery, AL, October 7-8, 2008.

"AASHTOWare Virtis/Opis 5.5 Fundamentals," National Course, Myrtle Beach, SC, August 21, 2007.

"Introduction to AASHTOWare Virtis 5.5 -- A Four-day Short Course," Michigan DOT, Lansing, MI, March 26-29, 2007.

"Introduction to AASHTOWare Virtis 5.5 -- A Two-day Short Course," New Mexico DOT, Santa Fe, NM, December 5-6, 2006.

"Introduction to AASHTOWare Virtis 5.4 -- A Two-day Short Course," Utah DOT, Salt Lake City, UT, September 19-20, 2006.

"Introduction to AASHTOWare Opis 5.4 -- A Two-day Short Course," Massachusetts Highway Department, Boston, MA, August 22-23, 2006 and August 24-25, 2006.

"Introduction to AASHTOWare Virtis 5.3 -- A Three-day Short Course," Florida DOT, Tallahassee, FL, April 4-7, 2006.

"Introduction to AASHTOWare Virtis 5.3 -- A Two-day Short Course," Virginia DOT, Richmond, VA, July 17-18, 2005.

"Introduction to AASHTOWare Opis 5.3 -- A Two-day Short Course," South Dakota DOT, Pierre, SD, May 15-16, 2005.

"Introduction to AASHTOWare Virtis 5.2 -- A Two-day Short Course," Colorado DOT, Denver, CO, April 26-27, 2005 and April 28-29, 2005.

"Introduction to AASHTOWare Virtis 5.1 -- A Two-day Short Course," Michigan DOT, Lansing, MI, September 2004.

"Introduction to AASHTOWare Virtis 5.1 -- A Two-day Short Course," City of Los Angeles Department of Public Work – Bureau of Engineering, Los Angeles, CA, December 2003.

"Advanced AASHTOWare Virtis/Opis 5.0 -- A One-day Short Course," National Course, Gulf Shores, AL, August 2003.

"Advanced AASHTOWare Opis 4.1 -- A One-day Short Course with Emphasis on Design," National Course, Lincoln, NE, August 2002.

"Introduction to AASHTOWare Virtis 4.1 -- A Three-day Short Course," City of Phoenix, Phoenix, AZ, June 2002.

"Advanced AASHTOWare Virtis/Opis 4.0 -- A One-day Short Course with Emphasis on Design," National Course, Albuquerque, NM, August 2001.

"Introduction to AASHTOWare Virtis/Opis 4.0 -- A Two-day Short Course," Colorado DOT, Denver, CO, August 2001.

"LRFD Short Course," Vermont Agency of Transportation, Montpelier, VT, May 2001.

"Introduction to AASHTOWare Virtis 4.0 -- A Three-day Short Course," Florida DOT, Tallahassee, FL, April 2001.

"Introduction to AASHTOWare Opis 4.0 -- A Two-day Short Course," Oklahoma DOT, Oklahoma City, OK, March 2001.

"Introduction to AASHTOWare Virtis 4.0 -- A Two-day Short Course," Oklahoma DOT, Oklahoma City, OK, March 2001.

"Introduction to AASHTOWare Virtis/Opis 4.0 -- A Two-day Short Course," Colorado DOT, Denver, CO, January 2001.

"Introduction to AASHTOWare Virtis/Opis 4.0 -- A Two-day Short Course," Massachusetts Highway Department, Boston, MA, January 2001.

"Refresher for AASHTOWare Virtis/Opis 3.0 -- A One-day Short Course," National Course, Minneapolis, MN, July 2000.

"Introduction to AASHTOWare Virtis 2.1 -- A Two-day Short Course," Michigan DOT, Lansing, MI, March 2000.

"Short Course for Prestressed Concrete and BRASS-GIRDER(LRFD)," Kansas Department of Transportation, Topeka, KS, May 2000.

"Introduction to AASHTOWare Opis 2.0 -- A Two-day Short Course," National Course, Sacramento, CA, April 1999.

"Introduction to AASHTOWare Virtis 2.0 -- A Two-day Short Course," National Course, Sacramento, CA, April 1999.

"Introduction to AASHTOWare Opis 2.0 -- A Two-day Short Course," National Course, Minneapolis, MN, April 1999.

"Introduction to AASHTOWare Virtis 2.0 -- A Two-day Short Course," National Course, Minneapolis, MN, April 1999.

"Bridge Rating and Analysis of Structural Systems (BRASS) Short Course," Corp of Engineers, Vicksburg, MS, July 1995 (with Dan Glandt).

Continuing Education - Student

Bridge Rating and Design Bridge (RADBUG) User Group Meeting, New Orleans, LA, August 2022.
Bridge Rating and Design Bridge (RADBUG) User Group Meeting, *Virtual*, August 2021.
Bridge Rating and Design Bridge (RADBUG) User Group Meeting, *Virtual*, August 2020.
Bridge Rating and Design Bridge (RADBUG) User Group Meeting, South Lake Tahoe, CA, July 2019.
Bridge Rating and Design Bridge (RADBUG) User Group Meeting, Boise, ID, August 2018.
Bridge Rating and Design Bridge (RADBUG) User Group Meeting, Kansas City, KS, August 2017.
Bridge Rating and Design Bridge (RADBUG) User Group Meeting, Chicago, IL, August 2016.
Bridge Rating and Design Bridge (RADBUG) User Group Meeting, Albany, NY, August 2015.
AASHTOWare Bridge Design and Rating User Group Meeting, Traverse City, MI, August 2014.
AASHTOWare Bridge Design and Rating User Group Meeting, Virginia Beach, VA, August 2013.
Virtis/Opis User Group Meeting, Niagara Falls, NY, July 2012.
Virtis/Opis User Group Meeting, Helena, MT, August 2011.
Virtis/Opis User Group Meeting, Nashville, TN, August 2010.
Virtis/Opis User Group Meeting, Denver, CO, August 2009.
Cretex Prestressed Concrete Products Seminar, WYDOT, Cheyenne, WY, February 26, 2009.
Virtis/Opis/BRASS User Group Meeting, Oklahoma City, OK, August 2008.
Virtis/Opis/BRASS User Group Meeting, Myrtle Beach, SC, August 2007.
Virtis/Opis/BRASS User Group Meeting, St. Louis, MO, August 2006.
Virtis/Opis/BRASS User Group Meeting, Baltimore, MD, August 2005.
"Bridge Design Using the AASHTO LRFD Bridge Design Specifications", LCCC, Cheyenne, WY, June 1-3, 2005.
Virtis/Opis/BRASS User Group Meeting, Burlington, VT, July 2004.
Highway Engineering Exchange Program (HEEP) International Conference, Cheyenne, WY, September 2003.
Virtis/Opis/BRASS User Group Meeting, Gulf Shores, AL, August 2003.
Annual Structural Engineering Conference, University of Illinois at Urbana-Champaign, Urbana, IL, April 2003.
BRASS/Virtis/Opis User Group Meeting, Lincoln, NE, August 2002.
BRASS/Virtis/Opis User Group Meeting, Albuquerque, NM, August 2001.
BRASS/Virtis/Opis User Group Meeting, Minneapolis, MN, July 2000.
BRASS/Virtis/Opis User Group Meeting, Nashville, TN, July 1999.
BRASS/Virtis/Opis User Group Meeting, Kansas City, MO, July 1998.
PCI Bridge Design Manual Seminar, Wyoming DOT, Cheyenne, WY, 1998.
Bridge Design Workshop, Kansas State University, Manhattan, KS, October 1997 (Kansas DOT sponsored).
BRASS User Group Meeting, Albany, NY, July 1997.
BRASS User Group Meeting, Boise, ID, July 1996.
BRASS User Group Meeting, Denver, CO, July 1995.