

Brian L. Goodrich, P.E.

Professional Registration

Structural Engineering, Wyoming Registration Number: 12358

Education

M.S. Civil Engineering (Structural Emphasis)
University of Wyoming, Laramie, WY; May 1999

B.S. Architectural Engineering (Structural Emphasis)
University of Wyoming, Laramie, WY; May 1995

General Qualifications

Mr. Goodrich is a principle programming engineer and:

- Maintains and enhances WYDOT's BRASS-GIRDER™, BRASS-GIRDER(LRFD)™, BRASS-PIER(LRFD)™, BRASS-CULVERT™, AASHTO's Virtis (ASD/LFD/LRFR), and AASHTO's Opis (LRFD).
- Implemented AASHTO LRFR in BRASS-GIRDER(LRFD)™ 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.
- Speaks regularly at AASHTO BRASS/Virtis/Opis Users' Group meetings and has taught many short courses on software and application of LRFD.
- Was an investigator in NCHRP 12-50 and 12-62 and played a critical role on that project.

Experience

BridgeTech, Inc., Laramie, WY

Senior Programming Engineer (September 2000 – Present)

Programming Engineer (June 1995 – August 2000)

Student Engineer (Part-time) (May 1994 – May 1995)

- Developing/maintaining/enhancing bridge engineering software.
 - **BRASS-GIRDER(LRFD)™ Engine** (using Fortran), which analyzes and rates a bridge girder-line using the AASHTO LRFD *Bridge Design Specifications* and the *Manual for Condition Evaluation and Load and Resistance Factor Rating of Highway Bridges*. Developing subroutines that interpret input commands, perform cross-section analysis, perform specification checks, compute design ratios and rating factors, and output results in ASCII format.
 - **BRASS™ Engines** (using Fortran) for Wyoming Department of Transportation's Girder, Girder(LRFD), Culvert, and Distribution applications.
 - **BRASS™ Export Module** (using C++), which generates a BRASS-GIRDER™ or BRASS-GIRDER(LRFD)™ data file from the AASHTO Virtis®/Opis® bridge definition. Developing objects to make abstraction from bridge definition to mathematical model.

- **BRASS™ Import Utility** (using C++), which imports BRASS-GIRDER™ data files into the AASHTO Virtis® database. Developing objects to convert mathematical model to bridge definition.
 - **Next Generation BRASS™ User Interfaces** (using Microsoft C++ and .NET) for Wyoming Department of Transportation's Girder analysis and Library Utility applications.
 - **BRASS™ User Interfaces** (using Microsoft C++ and MFC) for Wyoming Department of Transportation's Culvert and Pier(LRFD) applications. Developing graphical display that links directly to input dialog fields. Implementing 3rd party plotting tool and grid control.
 - **BRASS™ User Interfaces** (using Borland C++) for Wyoming Department of Transportation's Girder(STD), Girder(LRFD), Pier, Pier(LRFD), Pole, Splice, Pad, Culvert, Distribution, and Library Utility applications.
 - **BRASS™ Help Systems** for Wyoming Department of Transportation's Girder, Girder(STD), Girder(LRFD), Pier, Pier(LRFD), Pole, Splice, Pad, Culvert, Distribution, and Library Utility applications.
- Developing bridge software validation process, as member of team of *NCHRP Project 12-50*. Implementing process in BRASS-GIRDER(LRFD)™ engine.
 - 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 AASHTO Virtis®/Opis® and WYDOT's BRASS-GIRDER™ and BRASS-GIRDER(LRFD)™ programs.
 - Developing/giving presentations on philosophy and progress of the BRASS-GIRDER™ and BRASS-GIRDER(LRFD)™ program at annual BRASS™ Users' 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++/Fortran/VBA Programming
- C++ Windows Programming in .NET
- C++ Windows Programming with MFC
- Estimating Programming Development
- Technical Writing
- Database Application Development
- Help System Development

Professional Organizations

American Society of Civil Engineers

Publications

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, Fifth International Bridge Engineering Conference, Tampa, FL, 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, Fifth International Bridge Engineering Conference, Tampa, FL, 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

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

"Introduction to AASHTOWare Opis 6.0 -- A Two-day Short Course," Alabama DOT, Montgomery, AL, Oct 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

Virtis/Opis Users' Group Meeting, Nashville, TN, August 2010.

Virtis/Opis Users' Group Meeting, Denver, CO, August 2009.

Cretex Prestressed Concrete Products Seminar, WYDOT, Cheyenne, WY, February 26, 2009.

Virtis/Opis/BRASS Users' Group Meeting, Oklahoma City, OK, August 2008.

Virtis/Opis/BRASS Users' Group Meeting, Myrtle Beach, SC, August 2007.

Virtis/Opis/BRASS Users' Group Meeting, St. Louis, MO, August 2006.

Virtis/Opis/BRASS Users' 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 Users' Group Meeting, Burlington, VT, July 2004.

Highway Engineering Exchange Program (HEEP) International Conference, Cheyenne, WY, September 2003.

Virtis/Opis/BRASS Users' Group Meeting, Gulf Shores, AL, August 2003.

Annual Structural Engineering Conference, University of Illinois at Urbana-Champaign, Urbana, IL, April 2003.

BRASS/Virtis/Opis Users' Group Meeting, Lincoln, NE, August 2002.

BRASS/Virtis/Opis Users' Group Meeting, Albuquerque, NM, August 2001.

BRASS/Virtis/Opis Users' Group Meeting, Minneapolis, MN, July 2000.

BRASS/Virtis/Opis Users' Group Meeting, Nashville, TN, July 1999.

BRASS/Virtis/Opis Users' 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 Users' Group Meeting, Albany, NY, July 1997.

BRASS Users' Group Meeting, Boise, ID, July 1996.

BRASS Users' Group Meeting, Denver, CO, July 1995.