

GEORGE HEARN is associate professor of civil engineering at the University of Colorado at Boulder. Prof. Hearn has more than forty years' experience in bridge inspection, design, rehabilitation and management. Prof. Hearn has served as principal investigator for bridge-related projects sponsored by the National Science Foundation, the National Academies, the US Federal Highway Administration and the State of Colorado. He is the author of the new AASHTO guide to bridge preservation actions, the principal investigator for the FHWA study of States' advice for preservation actions, the author of the 2014 synthesis on practices for bridge load posting¹, the author of the 2012 case studies of bridge management practices in Idaho, Michigan and Virginia², the author of the 2010 report on the domestic scan on *Bridge Management Decision Making*³, author of NCHRP Synthesis 375 *Bridge Inspection Practices*⁴ (2007), the principal investigator for NCHRP Project 14-15 *Developing a National Database System for Maintenance Actions on Highway Bridges*⁵ (2010), and the principal investigator in evaluation of bridge preservation costs for Colorado DOT⁶ (2012). He evaluated bridge deck durability for Colorado DOT⁷ (2007), designed modular reaction walls for CU's earthquake testing laboratory, wrote the report for the international scan trip on bridge preservation and maintenance⁸ (2005), developed a conceptual plan for a Colorado DOT system for maintenance management of retaining walls and sound barriers⁹ (2003), evaluated the effects of non-divisible loads on fatigue life of steel bridges for Colorado DOT (2001), established procedures for the use of NDE test data in element-level condition reports for the FHWA (2000), studied the reliability of field testing methods applied to highway bridges for the National Science Foundation (1998), developed methods for segmental inspections as a refinement to element-level condition reports for Colorado DOT (1997), and created the NBI translator for element-level condition data for the FHWA (1994 and 1997 revision). George Hearn is a member of the FHWA expert task group for bridge preservation, member of the NRC committee for technical advice to FHWA long term bridge performance program, and chair of TRB committee AHD30 Structures Maintenance. George Hearn is a licensed professional engineer.

¹ http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_syn_453.pdf

² <http://www.fhwa.dot.gov/asset/hif12029/hif12029.pdf>

³ http://onlinepubs.trb.org/onlinepubs/nchrp/docs/NCHRP20-68A_07-05.pdf

⁴ http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_syn_375.pdf

⁵ http://onlinepubs.trb.org/onlinepubs/nchrp/nchrp_rpt_668.pdf

⁶ <http://www.coloradodot.info/programs/research/pdfs/2012/pontis.pdf/view>

⁷ <http://www.coloradodot.info/programs/research/pdfs/2007/bridgedecklife.pdf/view>

⁸ <http://international.fhwa.dot.gov/pubs/pl05002/pl05002.pdf>

⁹ <http://www.coloradodot.info/programs/research/pdfs/2003/retainingwallmgt.pdf/view>

George Hearn
Associate Professor of Civil Engineering
University of Colorado at Boulder
303.492.6381
George.Hearn@colorado.edu

DES 1989 Columbia University
MS 1982 Columbia University
BE 1979 The Cooper Union

PE: New York, Colorado

Research Projects

Agency Rules for Bridge Preservation. (2017-2019). Sponsor: USDOT FHWA. Synthesis of practice and development of method to calibrate rules to guide selection of bridge preservation actions.

Proposed AASHTO Guide for Bridge Preservation Actions. (2015-2019) Sponsor: NAS-TRB. Preparation of new AASHTO guide to preservation of highway bridges.

Bridge Load Posting Practices of US State DOTs. (2012-2013) Sponsor: NAS-TRB. Collection and reporting on US nationwide policies on posting of highway bridges for weight restrictions.

Bridge Deterioration and Cost Data. (2008-2011) Sponsor: Colorado DOT. Development of model data for Pontis bridge management system.

Bridge Management Decision Making. (2009). NCHRP Project 20-07. Participant and report author for scan on bridge maintenance and management.

National Bridge Maintenance Database. (2005-2010) NCHRP Project 14-15. Development of a national database for bridge maintenance actions.

Bridge Inspection Practices. (2005-08) NCHRP Synthesis Project 37-05. Synthesis on US and international practices for bridge inspection.

NEES Lab Improvement. (2004-06) Sponsor: NEES/NSF. Design and fabrication of post-tensioned modular reaction wall for CU's earthquake simulation lab.

Bridge Deck Performance. (2004-07) Sponsor: Colorado DOT. Study of condition histories, construction costs and maintenance costs to determine annualized costs of four types of Colorado DOT bridge decks.

FHWA/AASHTO Scan Report. (2004) Sponsor: FHWA. Preparation of the report of the 2003 Scan Trip on Bridge Preservation.

Retaining Wall Management System. (2003) Sponsor: Colorado DOT. Conceptual development of an element-based maintenance management system for retaining walls along highway corridors.

Independent Facing for Mechanically Stabilized Walls. (2002). Sponsor: Colorado DOT. Review of final report on construction and performance of an IFF wall along I-25 in Denver.

Computational Simulation of Aerodynamic Response of the Bronx-Whitestone Bridge. (2001) Sponsor: National Science Foundation. Use of computational fluid dynamics to investigate aerodynamic stability of the Bronx-Whitestone bridge.

Nondivisible Load Study. (2000) Sponsor: Colorado DOT. Evaluation of effects on fatigue life of highway bridges of non-divisible loads from concrete precasting plants.

Engineering Projects

Water Storage, Peru. Review of structural engineering design of a water filtering and storage facility for Engineers Without Borders in Peru.

Crow Solar Tepee, Billings, Montana. Structural engineering design of a communal residence for the Crow nation.

Leopoldau Busgarage, Vienna, Austria Nonlinear structural analysis of 90m x 140m tensioned fabric roof for Vienna transportation terminal.

Chouteau Bridge, Kansas City, Missouri Review of rehabilitation plans for 19th century iron eyebar railroad bridge converted to automobile use.

Roebing's Delaware Aqueduct, Minisink Ford, N.Y. Nonlinear structural analysis for rehabilitation design of unstiffened four-span suspension bridge. Built in 1847 as a part of the D&H canal, the bridge now carries a county road.

Gymnasium Addition, Cable Building, New York, N.Y. Design of 20,000 SF mezzanine for existing interior space in historic NYC building.

Bronx-Whitestone Bridge, New York, N.Y. Rehabilitation of motion sensors and data logger on Bronx-Whitestone suspension bridge. The system is part of a recording and warning system for large wind-induced motions.

Manhattan Bridge Rehabilitation, New York, N.Y. Analysis and structural design for rehabilitation of the 1908 suspension bridge over the East River.

Palisades Interstate Parkway, New Jersey Inspection and rehabilitation design for 15 overpass bridges.

Arch Bridge, Ithaca, New York Stiffening of 19TH century earth-filled brick arch bridge to increase load rating to HS-20. Nonlinear stability analysis performed.

Reticulated Wood Dome, Southern Wells, Indiana Stability analysis and design of stiffening for reticulated wood dome which had buckled at one joint.

Fabric Structures Analysis and design for air-supported and cable-supported fabric roofs including: Minneapolis Municipal Stadium, Hoosierdome (Indianapolis), BC Place (Vancouver), Yanbu Pavillion (Saudi Arabia) and Riyadh Stadium (Saudi Arabia)

Patents

Flex Post Fence, US Patent 5,299,781 Hearn, G., Barrett,R.K., and McMullen,M.L. rights assigned to State of Colorado. Description: Self-resetting, cable net fence capable of large elastic deformations during impact by falling boulders.

Independent Facing for Mechanically Stabilized Earth Walls, US Patent 5,456,554, Hearn,G., Barrett,R.K., Henson, H. and McMullen,M.L., rights assigned to State of Colorado. Description: Flexible anchoring system for facing panels for mechanically stabilized earth walls.

Recent Publications

- Hearn,G. (2019). Guide for Bridge Preservation Actions. Approved by AASHTO COBS, 350p.
- Hearn,G., (2017). *Bridge Element Condition Reports in Performance Measures for Bridge Preservation*. Trans. Res. Rec. 2612, doi 10.3141/2612-16.
- Hearn,G., (2016). *A Bridge Preservation Index and Its Relation to National Performance Management Measures*. TRB Annual Mtg., Paper 16-2301, 14p.
- Hearn,G., (2015). *Element-Level Performance Measures for Bridge Preservation*. Trans. Res. Rec. 2481, p10-17.
- Hearn,G. (2014). *State Bridge Load Posting Processes and Practices*. Natl Acad., NCHRP Synthesis 453. 136p.
- Hearn,G. (2014). *Status of Posting for Load Among U.S. Bridges and Culverts*. TRB Annual Mtg., Paper 14-3072, 15p.
- Hearn,G, Juntunen,D., Ahmad,A.S., and Johnson,B.V. (2013). *Performance Measures for Bridge Preservation*. Trans. Res. Rec. 2360, p45–51.
- Hearn,G., Pan,S-Y, and Casey,W.F. (2013). *Bridge Management Practices in Idaho, Michigan and Virginia*. TRB Annual Mtg., Paper 13-0869, 14p.
- Hearn,G. (2012) *Deterioration and Cost Information for Bridge Management*. Colorado DOT, CDOT-2012-4, 354p.
- Hearn,G. (2012). *Bridge Management Practices in Idaho, Michigan and Virginia*. USDOT FHWA, <http://www.fhwa.dot.gov/asset/hif12029/hif12029.pdf>, 42p.
- Hearn,G. and Johnson,B.V. (2011). *An Overview of Identification and Tracking of Highway Bridge Maintenance Actions*. NAS-TRB, Transp. Res. Rec. No 2220, p12-20
- Hearn, G., Thompson P.D., Mystkowski,W., and Hyman,W. (2010) *Framework for a National Database System for Maintenance Actions on Highway Bridges*. Natl Acad NCHRP, Report 668, 96p. Appendices A thru E, 191p.
- Hearn, G. Weykamp,P., Kimball,T., Johnson,B.V., Ramsey,K., D’Andrea,A. and Becker,S. (2010) *Best Practices in Bridge Management Decision-Making*. Natl Acad NCHRP, 20-68A Scan 07-05, 256p.
- Weykamp,P., Kimball,T., Johnson,B.V., Becker,S., D’Andrea,A. Hearn,G., and Capers,H. (2010). *Taming the Bridge Inventory*. Roads and Bridges, V48, No3, p30-34.
- Hearn, G. (2007). *Bridge Inspection Practices*. Natl Acad NCHRP, Synthesis 375, Washington, 199p.
- Hearn,G. and Xi, Y-P (2007). *Service life and cost comparisons for four types of Colorado DOT bridge decks*. Colorado DOT, CDOT-DTD-R-2007-2, 100p
- Hearn,G., and Adams,E. (2006). *Shape selection for lattice structures*. ASCE Jou. Struct. Engrg., Vol 132, No 11, 1713-1720.
- Hearn,G., Puckett,J., Friedland,I., Everett,T., Hurst,K., Romack,G., Christian,G., Shepard,R., Thompson, T., and Young,R. (2005). *Bridge preservation and maintenance in Europe and South Africa*. FHWA Int’l Prog., FHWA-PL-04-007, Washington, 150p.
- Puckett,J. and Hearn,G., (2005). *Summary of AASHTO and FHWA international scanning tour for Bridge preservation and maintenance*. Trans. Res. Rec., CD-11S, p517-523.
- Hearn,G., Abu-Hejleh,N., and Koucherik,J. (2004). *Inventory system for retaining walls and sound barriers*. Trans. Res. Rec. 1866, TRB, Washington, p85-91.
- Hearn,G. (2003). *Feasibility of a management system for retaining walls and sound barriers*. Colorado DOT, CDOT-DTD-R-2003-8. Denver, 106p.

- Hearn, G., Abu-Hejleh,N., McMullen,M., Zornberg,J.G. (2003). *MSE walls with independent full-height facing panels*. NAS TRB 82nd Annual Mtg, Washington, DC. 8p.
- Abu-Hejleh,N., McMullen,M., Hearn,G., and Zornberg,J.G. (2001). *Design and construction guidelines for MSE walls with independent full-height facing panels*. Colorado DOT, CDOT-DTD-R-2001-5, Denver, 120p.
- Hearn,G. (2000). *Fatigue Evaluation of Four Steel Bridges Under Nondivisible Loads*. For TMS Consultants, Boulder, 385p.
- Hearn,G. and Shim,H. (2000). *Integration of nondestructive testing and bridge management systems*. Federal Highway Administration, 281p.
- Hearn,G. (2000). *Segmental inspection for improved condition reporting in BMS*. NAS TRB, Trans. Res. Circ. 498, Washington, DC, 8p.
- Hearn,G. (2000). *NDE in bridge management systems*. NAS TRB, Trans. Res. Circ. 498, Washington, DC. 13p.
- Hearn,G. (2000). *Condition states for highway bridges*. ASCE 2000 Structures Congress, Mohamed Elgaaly,ed, Philadelphia, PA, CD ROM, 8p.
- Hearn,G. Purvis,R.L., Thompson,P., Bushman,W.H., McGhee,K.K., McKeel,W.T.,Jr. (2000) *Bridge maintenance and management: a look to the future*. Transportation in the New Millennium, TRB, Washington, 7p.

Courses

- CVEN 4545 Design of Steel Structures
- CVEN 4555 Design of Reinforced Concrete Structures
- CVEN 5575 Advanced Design of Steel Structures
- CVEN 5585 Design of Prestressed Concrete Structures
- CVEN 5835 Design of Cable-Supported Structures.