

PHILLIP C. PIERCE, P.E.

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EDUCATION: *M.E./Pennsylvania State University/Engineering Science/1983
B.S./Pennsylvania State University/Civil Engineering/1972
Taught as Adjunct Faculty at Penn State - Middletown*

REGISTRATION: *Professional Engineer: DE, NH, NY, PA, RI, VT
NY License # 066954-1; current expiration date 9/30/2015*

SUMMARY OF PROFESSIONAL EXPERIENCE:

Mr. Pierce has over 40 years of extensive and varied experience in structural and transportation engineering, primarily focused on bridges. His background includes involvement on virtually all types of bridge engineering projects, ranging from routine minor drainage culverts to world-class suspension and cable-stayed structures. Project assignments have included highway, railway and pedestrian bridges having fixed and movable spans. Tasks have ranged from design of new structures to evaluation and rehabilitation of existing structures, including collapse investigations. Mr. Pierce has also participated in many types of building and general structural engineering projects and has served as Project Manager on numerous highway/bridge projects, including all aspects of the complete transportation package.

Mr. Pierce has served in various positions of responsibility on projects for 15 State DOT's, several transportation/bridge authorities, and many smaller agencies/clients on hundreds of design/rehabilitation projects and inspections/evaluations of thousands of bridges.

WORK EXPERIENCE:

Phillip C. Pierce, P.E., 2000-present

Specialty consulting engineering practice primarily aimed at covered bridge services. The most prominent assignment was being selected by the Federal Highway Administration to prepare the Covered Bridge Manual – completed and published in 2005. Clients have included other consulting firms, local government agencies, contractors, owners, and private individuals. Individual tasks have included inspection, evaluation and report preparation of existing structures, development of repair / rehabilitation recommendations and design details, design of temporary structures / temporary supports, and design of new structures for vehicles or pedestrians.

CHA Consulting, Inc., Albany, NY, 3/2007-present

Mr. Pierce serves as a Senior Principal Engineer in the Bridge unit of the Transportation Division. In this capacity, he is involved in development of technical products including reports, analytical evaluations, design, technical specifications, and plan preparation. He served as the manager of the firm's Region-wide bridge inspection assignments under contract with the NYSDOT representing some of the largest engineering fee projects of the firm. While being involved in scores of projects during his tenure at CHA, he recently served as the engineer of record for design of the world's longest authentic timber covered bridge of its type to replace one destroyed by flooding. He has also served as engineer of record for the just completed rehabilitation of Double Arch Bridge crossing of the Sing Sing Kill, which supports a section of the Old Croton Aqueduct – the first fresh water supply system for New York City. Mr. Pierce has also spearheaded the development of scour countermeasure construction details and cost estimates for hundreds of bridges in multiple states.

Delaware County (NY) Department of Public Works, 10/1999 – 2/2007

Mr. Pierce served as Deputy Commissioner responsible for the Engineering Unit that provides support for a large county in upstate New York with 270 miles of County-owned road and nearly 400 bridges and large culverts. The Department performs extensive bridge and roadwork with in-house forces, based on the engineering support under the guidance of the Deputy Commissioner. In this role, Mr. Pierce performed evaluations of scores of bridges to determine the appropriate

rehabilitation measures and/or determine need for replacement. Also, Mr. Pierce performed Level One load rating analyses of scores of bridges using hand calculations, general computer software, and developed specific design and rating spreadsheets for numerous kinds of superstructure elements.

Shumaker Consulting Engineering and Land Surveying, P.C., Vestal, NY, 3/1998 – 9/1999

Mr. Pierce joined the firm to help develop a bridge design service center within an established consulting engineering business. Among other responsibilities, Mr. Pierce served as Project Manager and Project Engineer on a bridge project involving the design of a replica covered bridge to replace one destroyed by ice damage. Mr. Pierce also served as PM/PE on a highway reconstruction project that included replacement of a bridge. Mr. Pierce was also involved with an active project within which Shumaker was providing a bridge inspection team, working in DOT Region 9, as a subconsultant to Clough Harbour Associates (CHA). Phil's responsibilities included general quality review and oversight of the work performed by the team.

McFarland-Johnson, Inc., Binghamton, NY, 10/1989 – 2/1998

Mr. Pierce served as Manager of the Structures Department for the variety of structural projects and tasks undertaken by the firm throughout New York and New England. The focus of the structural work was for bridges, but also included work on numerous building projects. His technical responsibilities involved supervision of contract document preparation for new structures and evaluations of existing structures. His administrative responsibilities included management of staff, budget control, time and manpower scheduling, marketing, proposal preparation and negotiations, staff training and quality assurance programs. Mr. Pierce also served as Project Manager on larger and unusual projects. Mr. Pierce also served on the Executive Committee for that was responsible for the operation of the firm.

Among Mr. Pierce's responsibilities involving bridge related work, he served as PM/PE on numerous bridge replacement/rehabilitation projects in several states and was involved with some of the more unusual aspects and bridges of the firm's multi-million dollar, multi-year bridge inspection contract for NJDOT.

Sverdrup Corporation, Falls Church, VA, 12/1987 – 9/1989

Mr. Pierce served as Deputy Section Manager, involving administrative and business development duties, and served as Senior Project Manager on several large and smaller projects. A major assignment included preliminary design of a 6,000-foot long bridge crossing of the Stono River near Charleston, SC (\$25,000,000). Another assignment included design of a moveable underdeck inspection platform system for the Grace Bridge at Charleston, SC (over 12,000 feet of structure).

Among other responsibilities, Mr. Pierce was involved with the firm's multi-million dollar project to inspect and rate the Cooper River Bridges in Charleston, SC – a pair of structures each over two miles long and containing two cantilever truss bridges connected by long approach structures.

Modjeski and Masters, Harrisburg, PA, 9/1972 – 12/1980 and 9/1981 – 11/1987

Mr. Pierce served in progressively more responsible positions culminating in selection as Associate in 1984. He served in various capacities on many bridge projects involving cable-stayed, suspension, cantilever truss, and moveable span structures. Assignments included field and office tasks on new and existing bridges. He was also involved in ongoing assignments at the Navy Ships Parts Control Center at Mechanicsburg, PA for work involving large timber, steel and concrete-framed warehouse structures. He also authored several computer programs, including an extensive program for prestressed-concrete members. Also, Mr. Pierce was responsible for starting a new branch office for the company.

Talbert-Cox Associates, Wilmington, NC, 1981

Mr. Pierce served as Deputy Bridge Section Manager, involving administrative and business development duties, and served as Senior Project Manager on several projects. Among other

responsibilities, Mr. Pierce was involved with the firm's multi-million dollar, multi-year project to inspect and rate over 1,000 bridges for NCDOT.

SUPPLEMENTAL INFORMATION:

Expanded Experience Profile of Representative Larger Bridge Projects:

Stono River Bridge Replacement, near Charleston, SC for SCDOT:

Project Manager for preliminary design of both steel and concrete alternatives for replacement of an existing low-level viaduct and movable span. The new structure contained a main span of 200 feet and a total length of 6,000 feet. The construction cost estimate was \$25,000,000.

Grace Bridge Crossing of the Cooper River at Charleston, SC for SCDOT:

Project Manager for design of new underdeck movable inspection platform system for the Grace Bridge. The two-mile long structure includes two cantilever truss structures with main spans over 1000 feet. The construction cost estimate of the inspection access system exceeded \$6,000,000.

Williams Viaduct Bridge Replacement at Lynchburg, VA for VDOT:

Project Manager for design of the concrete alternative that involved an 1,800-foot structure with 200-foot main spans of continuous prestressed concrete I-beams. Fast-track design. The construction cost estimate was \$8,000,000.

Horry County Outer Bypass, near Myrtle Beach, SC for SCDOT:

Project engineer involved with a corridor study and structures estimate for 35 miles of new 4-6 lane alignment to serve as an emergency egress out of the Myrtle Beach area. The project included a 4,500 foot long crossing of the Intracoastal Waterway (estimated at \$100,000,000) and up to 11 miles of viaduct structures to minimize impact on Carolina Bay wetland habitats. The construction cost estimate was \$350,000,000.

Weirton-Staubenville Cable-stayed crossing of the Ohio River, for WVDOH:

Senior engineer for design of the concrete alternative 820-foot main span bridge. The structure had to accommodate constructed river foundations that were designed for a steel alternative superstructure.

Hale Boggs Cable-stayed crossing of the Mississippi River near Luling, LA for LADOH:

Engineer for design of U.S. record size open-dredged caisson foundations to accommodate the 1,495-foot main span structure. Construction cost of four foundation units was \$35,000,000.

Selected Covered Bridge Experience:

Bartonsville Covered Bridge Replacement, VT – Engineer of record for the design of the replacement authentic timber covered bridge which has the longest single span supported by Town lattice trusses in the world.

FHWA Research Project – Development of Covered Bridge Manual, 2000-05 – Principal Investigator for development of a Manual published by FHWA dealing with all aspects of covered bridges, from initial evaluation and planning through preparation of design and rehabilitation plans and construction. In print May, 2005.

Long Range, Town-owned, Covered Bridge Study, Vermont AOT, Statewide, VT, 1992-95 – Project Manager for evaluations and report generation for 75 timber, covered bridges located throughout the State. The Study, costing over \$870,000, was the most expensive ever undertaken for work on covered bridges. The project involved traffic and structural considerations, computing the load rating capacities, and making recommendations to assist in preserving these historic structures indefinitely. Field-testing of distribution beams was included to assess the behavior of these controversial components. Work also

included research involving wooden peg testing at the Massachusetts Institute of Technology to assist evaluation of Town Lattice trusses.

Rehabilitation of Historic Covered Bridges / Design and Construction of Replica CBs – Mr. Pierce has served as Project Manager/Project Engineer on projects involving 15 historic covered bridges in four states.

Testing Experience:

Town Lattice Chord Element Distribution Tests, 2001 – Responsible for development, management, and engineering associated with a field-testing program of a Town Lattice supported covered bridge. The work measured the strains in the bottom chord elements at various locations to determine how loads are distributed around terminations of chord elements.

Lattice Member Testing at Virginia Tech, 1995-96 – Responsible for development and management of a laboratory testing program of eight lattice members removed from Town Lattice supported covered bridges in Vermont (preparatory for rehabilitation work of the bridges). The tests were conducted at Virginia Tech under the direction of Professor Joe Loferski, as a specialty subcontractor. Destructive and non-destructive tests were performed in accordance with the protocol contained in ASTM D198 for large specimens and D143 for small, clear specimens, obtained from the residue of the fractured components of the D198 tests.

Wooden Peg Connection Tests, 1995-96 – Responsible for development and management of a laboratory testing program of various full-size joint configurations simulating those of Town Lattice covered bridges. The work was performed at MIT under the direction of Drs. Ben Brungaber and Leonard Morse-Fortier, as specialty subconsultants. Measurement of several structural parameters included: tension, compression, bearing, and shear, parallel and perpendicular to grain.

Refined Analysis and Field Load Testing of the Brown Bridge, 1993-94 – This bridge was included in the Vermont Statewide Study of Town-owned Covered Bridges and represented a “typical” covered bridge supported by Town Lattice Trusses. The refined analysis included preparation of a three-dimensional finite-element computerized simulation of behavior with accompanying field-testing for verification of live load deflection predictions. The computer work was provided by Bridge Software Development International, Ltd, under the direction of Mr. Dann Hall. The research team is unaware of a more sophisticated computer analysis of a Town Lattice truss.

Timber “Distribution Beam” Tests, 1993 – Responsible for development and management of a field-testing program to ascertain the effectiveness of such beams. These longitudinally oriented structural elements have been added beneath the transverse floor beams at a number of covered bridges. Yet their effectiveness in distributing axle loads over a number of floor beams is controversial. That work included field instrumentation, engineering evaluation, and report preparation documentation.

PROFESSIONAL AFFILIATIONS:

Fellow, past Section officer and Council Delegate - American Society of Civil Engineers

Past Chair, ASCE’s Timber Bridge Committee

Member – Timber Framers’ Guild of North America

Member – multiple covered bridge preservation societies in North America

PUBLICATIONS / PRESENTATIONS:

Published scores of articles in various professional journals for over 30 years, most recently:

“The Replacement of the Bartonville Covered Bridge – it takes three to make one”, TIMBER FRAMING, Journal of the Timber Framers Guild, Summer 2013

"Fitch's Covered Bridge" – Case Study – NPS Guideline for the Rehabilitation of Covered Bridges, Winter 2013-2014

Published books:

Covered Bridge Manual, published by the Federal Highway Administration, 2004

"Covered Bridges", Chapter 15 of Timber Construction for Architects and Builders, McGraw-Hill, 1998, edited by Eliot W. Goldstein, AIA.

Presentations – invited speaker at scores of events including national and international audiences, most recently:

The Second National Covered Bridge Conference, Dayton OH, June 2013

The International Timber Bridge Conference, Las Vegas NV, September 2013

Timber Frame Engineering Council Symposium - Burlington, VT, August 2013

Timber Framers Guild – National Conference, Burlington VT, August 2013

Statewide Conference on Local Bridges, Syracuse NY, October 2013