THE STATE of ALASKA
GOVERNOR MIKE DUNLEAVY

Department of Transportation and Public Facilities

DESIGN & ENGINEERING SERVICES
Bridge Section

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December 16, 2022

Micki Minsch, EIT
ASCE Juneau Branch President
Via email at events@alaskacapitalengineers.org

Dear Micki,

I am pleased to nominate Elmer Marx, PE, SE, M.ASCE for the honor of 2023 ASCE Juneau Branch Engineer of the Year. Elmer meets the minimum award requirements by having lived in Juneau and worked as an engineer for the Department of Transportation & Public Facilities Bridge Section for almost 30 years.

As you can see from Elmer's attached resume, he has had an exemplary career of service to the State of Alaska and to the civil engineering profession. He began his career by earning a bachelor's degree and a master's degree in civil engineering at Pennsylvania State University in 1990 and 1993, respectively.

It is not an exaggeration to assert that Elmer has been one of the most, if not the most, influential and prolific bridge engineers in Alaska's history. He has independently designed more bridges in Alaska than any other single bridge engineer, so many that we lost count decades ago. In Juneau his new bridge designs include the Brotherhood Bridge and the two bridges at Sunny Point, and his bridge rehabilitation designs include the Lemon Creek and Gold Creek Bridges. He has also completed safety inspections for most, if not all, of the 1,055 state- and locally-owned bridges in Alaska.

Elmer has envisioned and advanced innovative technical research that has fundamentally improved the nation's understanding of seismic bridge engineering. He has served as a Chair of the National Academy of Engineering Transportation Research Board Committee for Seismic Design and Performance of Bridges and served on multiple National Cooperative Highway Research Program panels and projects. He currently serves on two technical subcommittees of the American Association of State Highway Transportation Officials (AASHTO) Committee on Bridges and Structures: steel bridges and loads. He was instrumental in the creation of the *AASHTO Guide Specifications for LRFD Seismic Bridge Design* and participated in the development of the *AASHTO Guide Specifications for Bridges Subject to Tsunami Effects*.

He has represented ASCE and the profession on a regular basis throughout his career by visiting countless schools and youth activities to promote civil engineering as a career. He has given

presentations at ASCE branch meetings, and his design for the Brotherhood Bridge was awarded the 2015-2016 Juneau Branch Project of the Year Award.

Elmer thoroughly deserves this award. I would also be interested in nominating him for state, regional, and national ASCE awards with your support.

Sincerely,

Leslie Daugherty

Leslie Daugherty, PE, SE
Chief Bridge Engineer

**Elmer E. Marx, P.E., S.E.**

## EDUCATION

| | | | |
|---|---|---|---|
| 1990 | Pennsylvania State University | University Park, PA | BSCE |
| 1993 | Pennsylvania State University | University Park, PA | MSCE |
| 1994 | University of Alaska | Juneau, AK | Arctic Engineering |

## EMPLOYMENT

| | | |
|---|---|---|
| 1993-Present | Engineer | State of Alaska Department of Transportation & Public Facilities |
| 1991-1992 | Researcher | Pennsylvania State University – Applied Research Laboratory |
| 1991-1992 | Instructor | Pennsylvania State University |
| 1990-1991 | Engineer | State of Alaska Department of Fish and Game |

## EXPERIENCE

More than twenty-five years of experience designing and analyzing over 100 reinforced concrete, prestressed concrete, structural steel and timber bridges in accordance with the AASHTO LRFD Bridge Design Specifications (LRFD), AASHTO Guide Specifications for LRFD Seismic Bridge Design (SGS) and the AASHTO Standard Specifications for Highway Bridges including:

- Precast, prestressed (P/S) concrete girders with integral bridge deck
- Precast, P/S concrete box girders with composite bridge deck
- Precast, P/S concrete girder with composite bridge deck made continuous for live load
- Cast-in-place, post-tensioned concrete box girders
- Single and multiple concrete column piers including large diameter drilled shafts
- Single and continuous span steel I and box girder bridges with composite bridge decks
- Steel through-girder railroad bridge (per AREMA)
- Concrete filled steel pipes
- Pile and soil supported footings
- Cantilevered retaining walls, wingwalls, and abutments

Technical advisor on research “Full-Scale Test of the Alaska Cast-in-Place Steel Shell Three Column Bridge Bent” performed by the University of California at San Diego. Authored designer oriented procedure “Seismic Pier Design for Steel Pipe Pile Extensions with Concrete Cap Beam” based upon the results of the research. Similar procedures are currently in use by or proposed for use by Caltrans, South Carolina DOT, the AASHTO Guide Specifications for LRFD Seismic Bridge Design and the NCHRP 12-49 “Comprehensive Specification for the Seismic Design of Bridges.”

Panel member for several NCHRP research and synthesis projects including: 20-05/43-07 performance-based seismic bridge design, 20-05/42-03 site specific evaluation of earthquake ground motions, 12-64 high-strength concrete axial and flexural provisions, 12-94 minimum flexural reinforcement, , 12-105 seismic specifications for ABC column connections, 12-69 long-span decked girders. Chair of NCHRP 12-114 seismic site response with pore water pressure generation and 12-101 bridges structures with energy-dissipating mechanisms in their columns.

Technical advisor on research “Seismic Behavior of Reinforced Concrete Bridge Columns at Sub-Freezing Temperatures” and “Strain Limits of Concrete Filled Steel Tubes in AASHTO Seismic Provisions” (Dr. Mervyn Kowalsky NCSU).

Technical advisor on research “Analysis of Laterally Loaded Piles in Frozen Soils” (Dr. Leroy Hulsey UAF and Dr. ZhaoHui Yang UAA) and other research projects related to frozen soils, liquefiable soils, and laterally-loaded concrete filled pipes in frozen soils.

Technical advisor for the “Strain Limits for Concrete Filled Steel Tubes” and “The Effects of Load History on Performance Limit States of Circular Bridge Columns.” These projects are sponsored by the Alaska DOT&PF and are aimed at better correlating the relationship between deformation and strain of seismically loaded bridge columns. The goal of each project is to provide quantifiable seismic performance parameter used in performance-based seismic design.

Technical advisor on research “Alaska DOT&PF Pile Extension Pier Pushover Software” (Dr. Michael Scott, OSU). This software uses the OpenSees framework to model and predict the force-displacement relationship of the Alaska style concrete filled steel pipe pile extension. This software includes the moment-curvature analysis and plastic hinging of the concrete filled steel pipe piles. The pier stiffness and deformation capacity allow for the more accurate modeling and evaluation of this style of pier.

Technical advisor for “MASH Testing Bridge Rail, Thrie Beam and W-Beam Transition” (Dr. William Williams, TTI). This project is developing new Test Level 4 bridge railing to meet the current crash testing AASHTO MASH standards. The new railing is based upon the previous bridge rail that was also tested by the Alaska DOT&PF.

**PROFESSIONAL REGISTRATION AND AFFILIATIONS**

Registered Professional Engineer in Alaska, CE 9490
Registered Professional Structural Engineer in Alaska, SE 13260
Member American Concrete Institute (ACI)
Member American Institute of Steel Construction (AISC)
Member American Society of Civil Engineers (ASCE)
Chair TRB AFF-50 Seismic Design and Performance of Bridges
Member AASHTO T-5 committee on Loads and Load Factors
Member AASHTO T-14 committee on Steel Bridges

**SAMPLE PUBLICATIONS**

Krauthammer, T., and Marx, E.(1994), "Combined Numerical Experimental Development of Innovative Structural Concrete Connections,” in: Building the Future, edited by F.K. Garas, G.S.T. Armer, and J.L. Clarke, E & FN SPON (Chapman & Hall), London.

Luis A. Montejo; Elmer Marx; Mervyn J. Kowalsky (2010).” Seismic design of reinforced concrete bridge columns at subfreezing temperatures,” ACI Structural Journal 107(4):427-433.

ZhaoHui "Joey" Yang, Qiang Li, Elmer E. Marx, Jinchi Lu (2012). "Seasonally frozen soil effects on the dynamic behavior of highway bridges." Sciences in Cold and Arid Regions, 4(1), 13-20.

Fuller, S.J., Nau, J.M., Kowalsky, M.J. and Marx, E.E. (2016). “Development of a ductile steel bridge substructure system,” Journal of Construction Steel Research, 118 (2016) 194-206.