DENNIS NOTTINGHAM, P.E., R.L.S.

Registered Civil Engineer, Alaska, 1963
Registered Civil Engineer, Washington, 1979
Registered Land Surveyor, Alaska, 1972
B.S., Civil Engrg., 1959, Montana State University
M.S., Civil Engrg., 1960, Montana State University

Fellow, ASCE and member of many other technical organizations

Mr. Nottingham began his construction and engineering career early in life by working for relatives building a wide variety of small projects utilizing concrete, masonry, timber and steel. Proficiency in farm and construction equipment operation and later training in welding and diving applied to underwater construction supplemented his practical background.

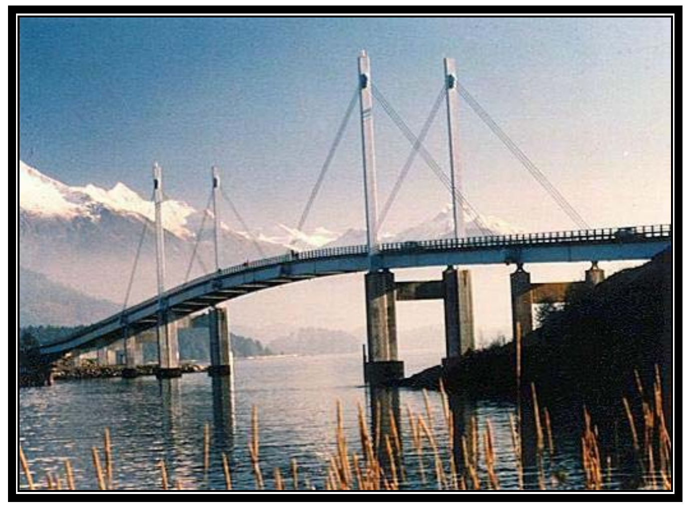
After graduating from Montana State University in 1960 with a M.S. in civil engineering (combined structures and geotechnical), he was employed by the Montana Highway Department Bridge Section for about two years. During that period he designed two major steel plate girder bridges (Missouri and Clarks Fork Rivers) and over 20 grade separation structures on the interstate system. He also developed prestressed concrete bridge standards for spans up to 120 feet.

Mr. Nottingham moved to Alaska in 1962, in time for major highway, Trans Alaska Pipeline and marine development, an opportunity seldom available to a young engineer. His academic background and knowledge of structures combined with geotechnical engineering was put to use immediately on large bridges. Ten years of service for the Alaska Department of Highways Bridge Section and over 25 years in private consulting saw his bridge design production soar to over 200 bridges of all types. The quality of his work was also evident with 15 Lincoln Arc Welding Awards (the most ever given in the USA), two AISC awards and numerous other honors. The latest National Steel Bridge Alliance (AISC) Award was in 1996: First place in the Special Bridge Category.

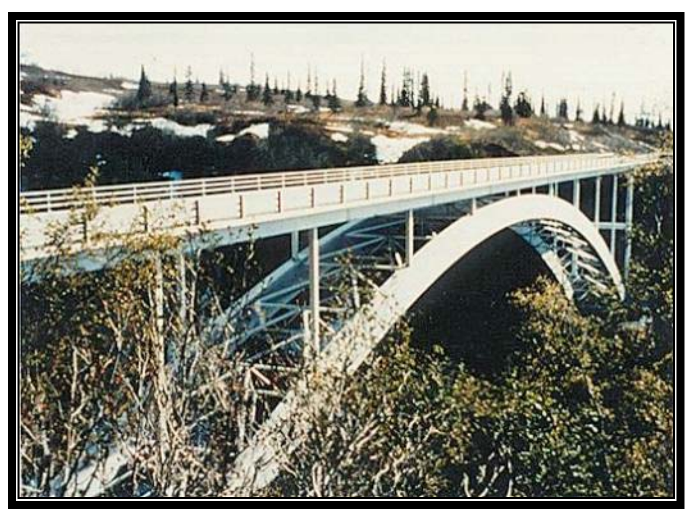
Mr. Nottingham was a graduate assistant instructor at Montana State University, taught six years in the Alaska University system, taught engineering refresher courses and still periodically gives lectures on arctic engineering and bridge engineering.

The following noteworthy bridges give a sampling of his broad bridge experience.

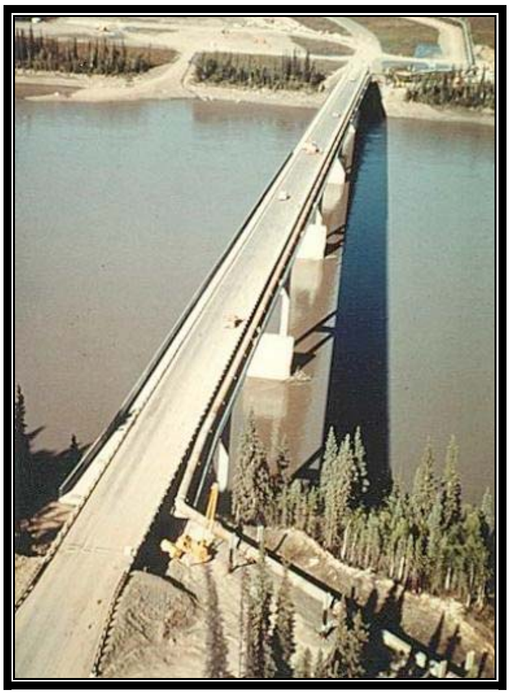
Sitka Harbor Bridge Mr. Nottingham analyzed the first cable-stayed vehicular bridge in the United States in 1969 with perhaps the first use of 3-D structural programs applied to bridge analysis using the IBM 1130 computer. The analysis complexity of this bridge type had prevented its use in the United States until this groundbreaking effort. The next major cable-stayed bridge was not built in the United States until eight years following construction of the Sitka Bridge. This bridge type is now commonly used in the United States and worldwide.



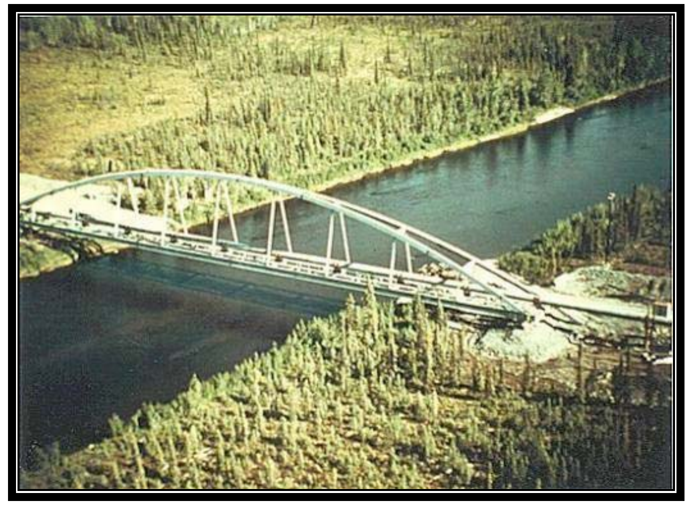
Hurricane Gulch Bridge Mr. Nottingham designed this long-span steel arch over a 230-foot deep gorge as part of the Alaskan Parks Highway project. It features twin steel box rib construction for torsional load distribution and pressure grouted rock abutments.



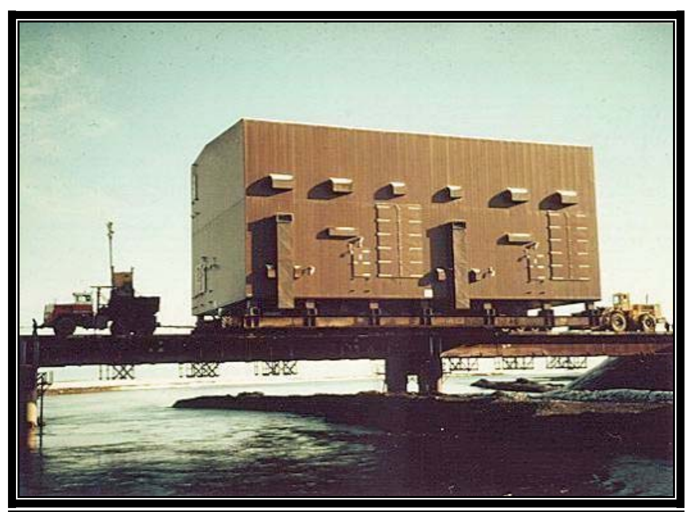
Yukon River Bridge This one-half mile long orthotropic steel box girder bridge won for Mr. Nottingham the top Lincoln Arc Welding Award in the United States for innovative use of welding in bridge construction. This bridge incorporated probably the first use of low-temperature steel and seismic design 20 years ahead of its time. In fact, current seismic codes are just now reaching the sophistication used in design of the Yukon River Bridge. This bridge carries the Dalton Highway and Trans Alaska Pipeline across a 2,000-foot channel of the Yukon River and its five-foot periodic ice floes and its peak 1.8 million-cubic foot per second flows.



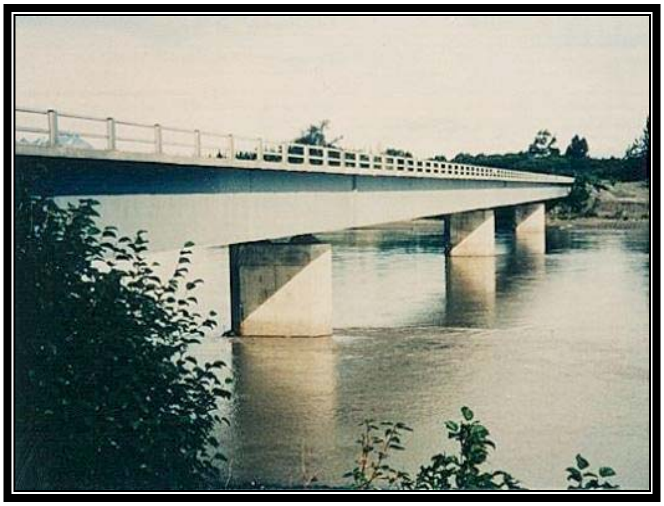
Gulkana River Bridge Construction on the TransAlaska Pipeline was stopped at the Gulkana River by unexpected permafrost conditions. Mr. Nottingham was called upon to conceive a bridge solution using only available cold weather steel and to design and assure construction completion within a five-month time limit. Failure to produce would mean delay in oil field startup and loss of millions of dollars per day. Initial concepts were produced within days and the aesthetic appearance of a slant leg tied arch was acceptable to permitting agencies. In less than one month the design was complete, and fabrication started. All steel weldments were preassembled and bolt holes reamed to assure field fit without delay. Construction was completed on schedule. This project has also received numerous awards and accolades for its inventive and unusual nature.



Kuparuk River Bridge Oil field traffic involving movement of large prefabricated building modules and drill rigs required bridges with live load capacities not previously envisioned. The Kuparuk River Bridge on the North Slope of Alaska was designed for a 2,300-ton live load. The solution used four steel box girders with a segmental concrete deck. Eleven general versions of this bridge type have been produced for mining and oil field projects.



Copper River Bridges Alaskan earthquake emergency funds required rapid completion of over one-half mile of major bridges across the Copper River, known for glacial lake dumps and severe and rapid flooding. Mr. Nottingham completed design of three multiple span plate girder bridges in one month. The design featured heavy piers subject to variable direction ice loads and composite continuous features in the superstructure.

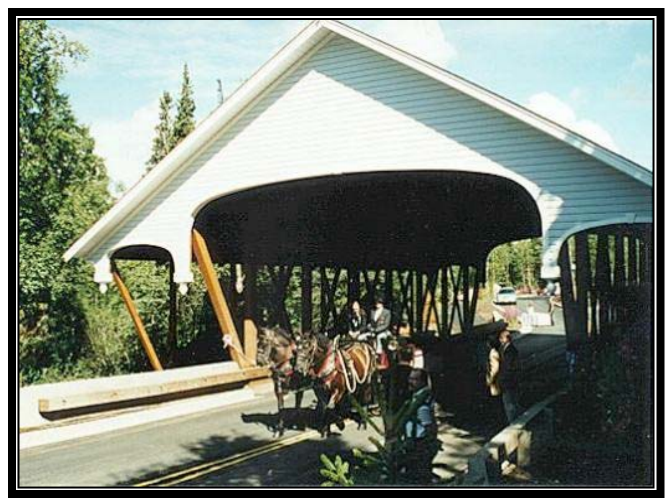


Tudor Road Trail Bridge Often smaller bridge projects present interesting engineering challenges as was the case with the Tudor Road bridge. For several years, design attempts were made to cross the busy five-lane Tudor Road with a multi-purpose trail used by everyone from hikers to bikers to dog teams.

The unusual curved orthotropic steel box girder solution avoided traffic delay, moving high-cost power and utilities and yet, provided for additional future lanes of traffic.

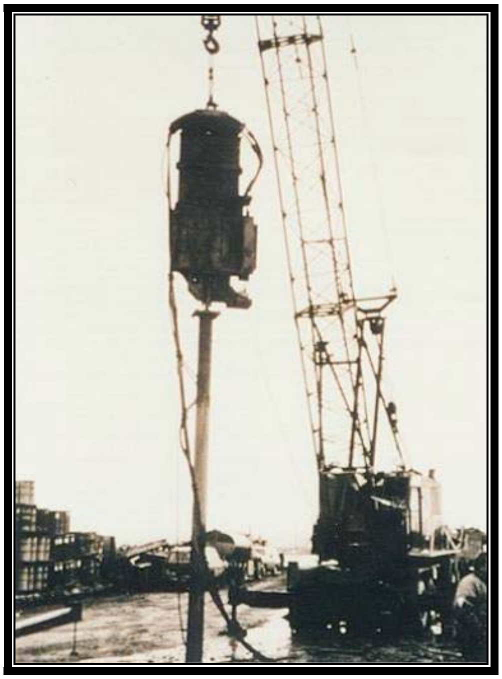
The 160-foot, curved restrained span won the 1996 National Steel Bridge Alliance (AISC) top award in the special purpose bridge category.

Goldenview Covered Bridge A unique covered bridge was requested by a developer in order to enhance a subdivision entrance. A low-maintenance, yet economical, solution was developed which met the aesthetic and functional needs.



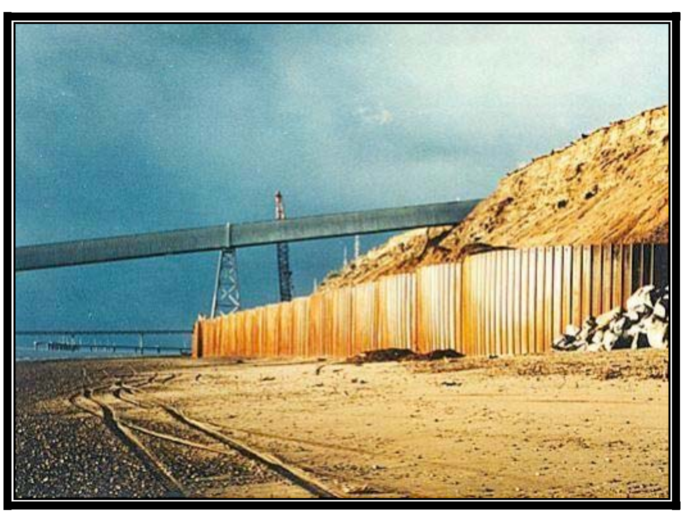
Mr. Nottingham is also known for his ability to innovate and for his research and development efforts. His work in these areas has saved clients multi-millions of dollars in reduced operations and maintenance costs, as well as first costs related to construction.

Specific examples of this include the following:



Research related to driven piles in permafrost and, following development, resulted in a patent and use of the thermally modified pilot hole technique for over 15,000 piles.

"Open-Cell" sheetpile bulkheads have revolutionized dock construction with a low-cost, extremely strong structure. The concept has also been used for bridge abutments, weirs, and erosion protection. Originally conceived in 1980, the idea has been used on about 70 structures through 1996, at very large savings to clients.



"Spin-fin" piles were researched and developed to address a need for high-tension capacity in marine structures. Research funded by PN&D, FHWA, and the State of Alaska, has helped better understand this concept. Over 2,000 of these piles have been installed up to 1997.

Other research and development of significance has been in the areas of:

- ❖ Permeable wave barriers.
- ❖ Geotextile retaining structures.
- ❖ Geotextile sediment control.
- ❖ Modular bridge and dock development.
- ❖ Ice loading on structures.
- ❖ Small boat harbor floats.
- ❖ Floating aquaculture pens.

In association with research and development, Mr. Nottingham has had published numerous technical papers and has given presentations at local, national, and international conferences.

The "Open-Cell" Innovation received the 1998 NOVA Award.