



# Engineering Iron and Stone: Understanding Structural Analysis and Design Methods of the Late 19th Century

By Ph.D., P.E., R.A. Thomas E. Boothby

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In the late 1800s new design opportunities to serve business and transportation abounded, and the civil engineering profession responded with efficient design methods to meet the surging demands. *Engineering Iron and Stone: Understanding Structural Analysis and Design Methods of the Late 19th Century* presents a comprehensive explanation of the empirical, graphical, and analytical design techniques used during this period in the construction of both large and small buildings and bridges in wood, stone, brick, and iron. Drawing on a career-long fascination with how structural engineers do their work, Thomas Boothby provides specific examples of these analysis and design methods applied to arches, girders, trusses, beams, and columns. The numerous calculations, drawings, and photographs, both historic and contemporary, illustrate the application of these techniques to a wide range of structures. While major civil engineering works of the Gilded Age are acknowledged, Boothby focuses on the smaller, more ordinary local projects that today's engineers might encounter and analyzes the significant body of engineering design that went into their construction. Boothby also points out the historic value in preserving the engineering techniques and ideas of that era. The rapidity of computation and the intimate relationship between the structure and its analysis have been lost in the numerically intensive analytical methods currently employed. Undertaking the historic preservation or rehabilitation of structures from the late 19th century can be challenging. Understanding the original design intent, however, can aid in a successful outcome. The quick and computationally efficient methods described in this book can assist present day engineers in understanding the behavior of these structures and give insight into their actual performance.

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### **Editorial Review**

#### About the Author

Thomas E. Boothby, Ph.D, P.E., R.A., is a professor of architectural engineering in the Department of Architectural Engineering at the Pennsylvania State University, where he has taught since 1992. He has written numerous journal papers and is currently researching the history and application of empirical design.

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