

**STRENGTH OF MATERIALS: A  
COMPREHENSIVE PRESENTATION OF  
SCIENTIFIC METHODS OF LOCATING AND  
DETERMINING STRESSES AND CALCULATING  
THE REQUIRED STRENGTH AND DIMENSIONS  
OF BUILDING MATERIALS**

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**Strength of Materials: A Comprehensive Presentation of Scientific Methods of Locating and Determining Stresses and Calculating the Required Strength and Dimensions of Building Materials** by Edward R. Maurer

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# STRENGTH OF MATERIALS

A COMPREHENSIVE PRESENTATION OF SCIENTIFIC METHODS  
OF LOCATING AND DETERMINING STRESSES AND  
CALCULATING THE REQUIRED STRENGTH  
AND DIMENSIONS OF BUILDING  
MATERIALS

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## INTRODUCTION

EVERY layman is fascinated by a great engineering work—a large sewage system, a Keokuk dam, a twenty-story steel structure—and wishes he might be able to construct such work and carry it to completion. And yet he hardly appreciates the knowledge, experience, and judgment necessary to bring such a work to a satisfactory close. Time was when all of the details of such structures were determined by guesswork, but the developments in science and mathematics have changed all that. Formulas for the various types of stresses have been worked out; constants for every known material have been collected; and a multitude of diagrams and tables contribute to making the engineer's work as precise as a bookkeeper's balance. The strength and size of every rivet and the length and cross-section of every girder in a steel structure are figured so they will bear the strains put upon them. The design of a masonry dam, the strength of the concrete mixture, and the amount of steel reinforcement are all mathematically determined in order to safely restrain the given volume of water behind it.

¶ The final judgment, therefore, as to the size of every part of the structure—must depend upon the designer's knowledge of "Strength of Materials." The treatment of Strength of Materials, as found in standard textbooks, is so clothed in abstruse mathematics that it is impossible for the average trained man to obtain a working knowledge of the subject. As the subject is one of the most important in any of the engineering branches, the author has thought it wise to present it in simple form, culling out all material that can not be used in practical design and analyzing the subject from the theory through to the practical formulas without the use of higher mathematics. In fact, he has used only such mathematics as may be easily understood. While the author has designed this work especially for home study purposes, the material is valuable to the college trained man as well, as it gives in clear, concise form the principles which are most used in engineering and architectural work. It is the hope of the publishers that the book will fill a place among the useful reference works in the field of engineering.





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