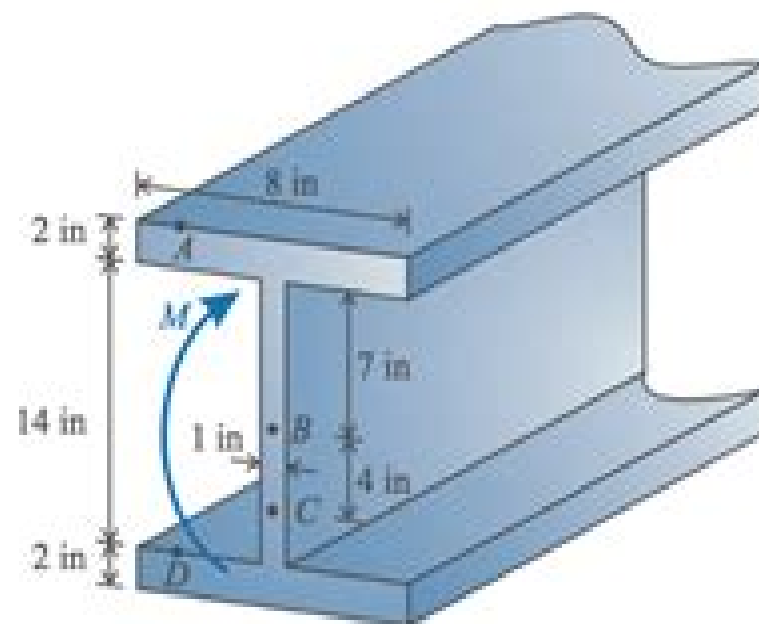


## 2. Bending of Wide-Flange Beam

Consider the wide-flange beam section shown in the figure below.



- Determine the percentage of the moment  $M$  that is resisted by the top and bottom flanges of the beam.
- Determine the direction (sign) and magnitude of the moment  $M$  that should be applied to the beam to cause a tensile stress of 22 ksi at point  $A$ . Draw the stress distribution acting on the cross section.
- Determine the maximum bending normal stress,  $\sigma_{max}$  and also the bending stress at points  $A$ ,  $B$ ,  $C$ , and  $D$  in the beam, if the moment  $M$  is equal to 20 kip·ft (Moment is applied as shown in figure).
- Determine the resultant force the bending stress on the top flange creates if the moment  $M$  is equal to 10 kip·ft (Moment is applied as shown in figure).

# Wide Flange Steel Manual

**James R. Underwood, Michele Chiuini**



## Wide Flange Steel Manual:

**Steel Structures** Charles G. Salmon, John Edwin Johnson, Faris Amin Malhas, 2009 The design of structural steel members has developed over the past century from a simple approach involving a few basic properties of steel and elementary mathematics to a more sophisticated treatment demanding a thorough knowledge of structural and material behavior *Steel Structures Design and Behavior 5 e* strives to present in a logical manner the theoretical background needed for developing and explaining design requirements Beginning with coverage of background material including references to pertinent research the development of specific formulas used in the AISC Specifications is followed by a generous number of design examples explaining in detail the process of selecting minimum weight members to satisfy given conditions

**Technical Manual** United States. War Department, 1972 *Technical Manual* United States Department of the Army, 1965 The Engineering Handbook Richard C Dorf, 2018-10-03 First published in 1995 The Engineering Handbook quickly became the definitive engineering reference Although it remains a bestseller the many advances realized in traditional engineering fields along with the emergence and rapid growth of fields such as biomedical engineering computer engineering and nanotechnology mean that the time has come to bring this standard setting reference up to date New in the Second Edition 19 completely new chapters addressing important topics in bioinstrumentation control systems nanotechnology image and signal processing electronics environmental systems structural systems 131 chapters fully revised and updated Expanded lists of engineering associations and societies The Engineering Handbook Second Edition is designed to enlighten experts in areas outside their own specialties to refresh the knowledge of mature practitioners and to educate engineering novices Whether you work in industry government or academia this is simply the best most useful engineering reference you can have in your personal office or institutional library Structural Steel Designer's Handbook Roger Brockenbrough, Frederick Merritt, 1999-12-02 The only A Z guide to structural steel design Find a wealth of practical techniques for cost effectively designing steel structures from buildings to bridges in *Structural Steel Designer's Handbook* by Roger L Brockenbrough and Frederick S Merritt The Handbook's integrated approach gives you immediately useful information about steel as a material how it's fabricated and erected how to analyze a structure to determine internal forces and moments from dead live and seismic loads how to make detailed design calculations to withstand those forces This new third edition introduces you to the latest developments in seismic design including more ductile connections and high performance steels offers an expanded treatment of welding helps you understand design requirements for hollow structural sections and for cold formed steel members and explores numerous design examples You get examples for both Load and Resistance Factor Design LRFD and Allowable Stress Design ASD Handbook of Structural Engineering W.F. Chen, E.M. Lui, 2005-02-28 Continuing the best selling tradition of the Handbook of Structural Engineering this second edition is a comprehensive reference to the broad spectrum of structural engineering encapsulating the theoretical practical and

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**Structural Design** James R. Underwood, Michele Chiuini, 2011-11-07 Written for the practicing architect Structural Design addresses the process on both a conceptual and a mathematical level Most importantly it helps architects work with structural consultants and understand all the necessary considerations when designing structural systems Using a minimum of simple math this book shows you how to make correct design calculations for structures made from steel wood concrete and masonry What's more this edition has been completely updated to reflect the latest design methods and codes including LRFD for steel design The book was also re designed for easy navigation Essential principles as well as structural solutions are visually reinforced with hundreds of drawings photographs and other illustrations making this book truly architect friendly

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William J. Slattery, 1972

*Architectural Structures* J. Wayne Place, 2007-03-16 ARCHITECTURAL STRUCTURES Architecture A highly illustrative structural design resource for architects and builders Architectural Structures provides the critical tools and know how to design and build structures that will withstand wind earthquakes and other forces This major survey of structural design is a useful guide to the fundamentals of establishing the structural concept for a building and dealing with structural issues Using diagrams models computer simulations case studies and exercises Architectural Structures provides a comprehensive narrative that makes selecting and giving shape to structures and structural elements understandable In addition to developing the necessary vocabulary to effectively work with structural engineers it helps readers gain a common sense understanding of principles and issues the complexities of the design process and useful

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Mechanical Contractors and Plant Facility Engineers The book will end the frustration on a busy day searching for design criteria      *Ultimate Limit State Design of Steel-Plated Structures* Jeom Kee Paik, Anil Kumar Thayamballi, 2003-03-28 Steel plated structures are important in a variety of marine and land based applications including ships offshore platforms power and chemical plants box girder bridges and box girder cranes The basic strength members in steel plated structures include support members such as stiffeners and plate girders plates stiffened panels grillages and box girders During their lifetime the structures constructed using these members are subjected to various types of loading which is for the most part operational but may in some cases be extreme or even accidental *Ultimate Limit State Design of Steel Plated Structures* reviews and describes both fundamentals and practical design procedures in this field The derivation of the basic mathematical expressions is presented together with a thorough discussion of the assumptions and the validity of the underlying expressions and solution methods Particularly valuable coverage in the book includes Serviceability and the ultimate limit state design of steel structural systems and their components The progressive collapse and the design of damage tolerant structures in the context of marine accidents Age related structural degradation such as corrosion and fatigue cracks Furthermore this book is also an easily accessed design tool which facilitates learning by applying the concepts of the limit states for practice using a set of computer programs which can be downloaded In addition expert guidance on mechanical model test results as well as nonlinear finite element solutions sophisticated design methodologies useful for practitioners in industries or research institutions selected methods for accurate and efficient analyses of nonlinear behavior of steel plated structures both up to and after the ultimate strength is reached is provided Designed as both a textbook and a handy reference the book is well suited to teachers and university students who are approaching the limit state design technology of steel plated structures for the first time The book also meets the needs of structural designers or researchers who are involved in civil marine and mechanical engineering as well as offshore engineering and naval architecture      *The Civil Engineering Handbook* W.F. Chen, J.Y. Richard Liew, 2002-08-29 Providing extensive coverage of all major areas of civil engineering the second edition of this award winning handbook features contributions from leading professionals and academicians and is packed with formulae data tables and definitions vignettes on topics of recent interest and additional sources of information It includes a wealth of material in areas such as coastal engineering polymeric materials computer methods shear stresses in beams and pavement performance evaluation Its wide range of information makes it an essential resource for anyone working in civil structural or environmental engineering

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