Balsa Wood Truss Bridge Designs

DUKE WESTON

Principles of Economy in the Design of Metallic Bridges New Society Publishers
Timber's strength, light weight, and energy-absorbing properties furnish features desirable for bridge construction. Timber is capable of supporting short-term overloads without adverse effects. Contrary to popular belief, large wood members provide good fire resistance qualities that meet or exceed those of other materials in severe fire exposures. From an economic standpoint, wood is competitive with other materials on a first-cost basis and shows advantages when life cycle costs are compared. Timber bridges can be constructed in virtually any weather conditions, without detriment to the material. Wood is not damaged by continuous freezing and thawing and resists harmful effects of de-icing agents, which cause deterioration in other bridge materials. Timber bridges do not require special equipment for installation and can normally be constructed without highly skilled labor. They also present a natural and aesthetically pleasing appearance, particularly in natural surroundings. The misconception that wood provides a short service life has plagued timber as a construction material. Although wood is susceptible to decay or insect attack under specific conditions, it is inherently a very durable material when protected from moisture. Many covered bridges built during the 19th century have lasted over 100 years because they were protected from direct exposure to the elements. In modem applications, it is seldom practical or economical to cover bridges; however, the use of wood preservatives has extended the life of wood used in exposed bridge applications. Using modem application techniques and preservative chemicals, wood can now be effectively protected from deterioration for periods of 50 years or longer. In addition, wood treated with preservatives requires little maintenance and no painting. Another misconception about wood as a bridge material is that its use is limited to minor structures of no appreciable size. This belief is probably based on the fact that trees for commercial timber are limited in size and are normally harvested before they reach maximum size. Although tree diameter limits the size of sawn lumber, the advent of glued-laminated timber (glulam) some 40 years ago provided designers with several compensating alternatives. Glulam, which is the most widely used modem timber bridge material, is manufactured by bonding sawn lumber laminations together with waterproof structural adhesives. Thus, glulam members are virtually unlimited in depth, width, and length and can be manufactured in a wide range of shapes. Glulam provides higher design strengths than sawn lumber and provides better utilization of the available timber resource by permitting the manufacture of large wood structural elements from smaller lumber sizes. Technological advances in laminating over the past four decades have further increased the suitability and performance of wood for modern highway bridge applications.

Developments in bridge design and construction CRC Press
This book, along with the West Point Bridge Designer software, help teach students that the essence of engineering is design and that engineering design entails the application of math, science, and technology to create something that meets a human need

User Friendly Guide to Timber Bridges CRC Press
Describes the history and different types bridges and bridges including arch bridges, suspension bridges, trestle bridges, and cantilever bridges. Some well-known bridges are highlighted.
Bridge Building Routledge
First Published in 1999: The Bridge Engineering Handbook is a unique, comprehensive, and state-of-the-art reference work and resource book covering the major areas of bridge engineering with the theme "bridge to the 21st century."
Innovative Bridge Designs for Rapid Renewal: ABC Toolkit High Five Reading (RBL)
Build almost anything!
Bridge Building Springer Science & Business Media
A controversy, between J.A.L. Waddell and others, provoked by a review of his "System of iron railroad bridges for Japan."
Bridge Design: Steel and composite construction (AS 5100.6-2004) Thomas Telford
"TRB's second Strategic Highway Research Program (SHRP 2) S2-R04-RR-1: Innovative Bridge Designs for Rapid Renewal documents the development of standardized approaches to designing and constructing complete bridge systems for rapid renewals. The report also describes a demonstration project on US 6 over the Keg Creek near Council Bluffs, Iowa that was completed in 2011 using the accelerated bridge construction standards developed as part of Renewal Project R04."--Publication info.
Structures or Why things don't fall down Transportation Research Board
In 2003, there were 38 metal truss bridges 50 years of age or older remaining on the State of Texas highway system. Of these 38 bridges, 33 are listed in the National Register of Historic Places. Many of these bridges do not meet current design criteria for rehabilitation due to narrow deck widths, low vertical clearance, and substandard load capacity. In addition, the existing bridge railing systems on these bridges have not been shown to meet the current requirements for safety and strength. This project addressed the design and performance of acceptable traffic railings for existing and new truss bridges in Texas. Specific objectives were to: * design/develop a retrofit railing for low-speed application on the Roy B. Inks Bridge in Llano, Texas; * design/develop a retrofit railing for high-speed application on the U.S. 281 Bridge over the Brazos River in Palo Pinto County, Texas; * identify criteria that can serve as a basis for design exceptions; and design/develop a traffic railing for new truss bridges.
Timber Bridges Sterling Publishing Company, Inc.
I am very much aware that it is an act of extreme rashness to attempt to write an elementary book about structures. Indeed it is only when the subject is stripped of its mathematics that one begins to realize how difficult it is to pin down and describe those structural concepts which are often called' elementary'; by which I suppose we mean 'basic' or 'fundamental'. Some of the omis sions and oversimplifications are intentional but no doubt some of them are due to my own brute ignorance and lack of under standing of the subject. Although this volume is more or less a sequel to The New Science of Strong Materials it can be read as an entirely separate book in its own right. For this reason a certain amount of repetition has been unavoidable in the earlier chapters. I have to thank a great many people for factual information, suggestions and for stimulating and sometimes heated discussions. Among the living, my colleagues at Reading University have been generous with help, notably Professor W. D. Biggs (Professor of Building Technology), Dr Richard Chaplin, Dr Giorgio Jeronimidis, Dr Julian Vincent and Dr Henry Blyth; Professor Anthony Flew, Professor of Philosophy, made useful suggestions about the last chapter. I am also grateful to Mr John Bartlett, Consultant Neurosurgeon at the Brook Hospital. Professor T. P. Hughes of the University of the West Indies has been helpful about rockets and many other things besides. My secretary, Mrs Jean Collins, was a great help in times of trouble. Mrs Nethercot of Vogue was kind to me about dressmaking. Mr Gerald Leach and also many of the editorial staff of Penguins have exercised their accustomed patience and helpfulness. Among the dead, I owe a great deal to Dr Mark Pryor - lately of Trinity College, Cambridge - especially for discussions about biomechanics which extended over a period of nearly thirty years. Lastly, for reasons which must surely be obvious, I owe a humble oblation to Herodotus, once a citizen of Halicamassus.
Wood Bridges Government Printing Office
Simple and beautifully illustrated introduction to the use of reciprocal frame structures in architecture.
Bridge design. 4. ed Nomad Press

Describes the history and different types bridges and bridges including arch bridges, suspension bridges, trestle bridges, and cantilever bridges. Some well-known bridges are highlighted.
Steel Bridge Designing Delmar
Focusing on the conceptual and preliminary stages in bridge design, this book addresses the new conceptual criteria employed when evaluating project proposals, considering elements from architectural aspects and structural aesthetics to environmental compatibility.;College or university bookstores may order five or more copies at a special student price. Price is available on request.
Bridge Specifications, Design of Plate Girders, Design of a Highway Truss Bridge, Design of a Railroad Truss Bridge, Wooden Bridges, Roof Trusses, Bridge Piers and Abutments, Bridge Drawing Garrett Boon
This book aims to brige the gap between engineers' and architects' understanding of structural form. Its intention is to inspire the development of innovative and viable structures. It presents case studies where imaginative structural forms are in harmony with the architectural concept and at the same time present very efficient solutions to technical and structural problems.
A Description of the Improved Truss Bridge Capstone Classroom
Bridges built in timber are enjoying a significant revival, both for pedestrian and light traffic and increasingly for heavier loadings and longer spans. Timber's high strength-to-weight ratio, combined with the ease and speed of construction inherent in the off-site prefabrication methods used, make a timber bridge a suitable option in many different scenarios. This handbook gives technical guidance on forms, materials, structural design and construction techniques suitable for both small and large timber bridges. Eurocode 5 Part Two (BS EN 1995-2) for the first time provides an international standard for the construction of timber bridges, removing a potential obstacle for engineers where timber construction for bridges has not – in recent centuries at least – been usual. Clearly illustrated throughout, this guide explains how to make use of this oldest construction material in a modern context to create sustainable, aesthetically pleasing, practical and durable bridges. Worldwide examples include Tourand Creek Bridge, Canada; Toijala, Finland; Punt la Resgia, Switzerland; Pont de Crest, France; Almorere Pylon Bridge, the Netherlands.
Rationale of Bridge Design Routledge
How did somebody come up with the idea for bridges, skyscrapers, helicopters, and nightlights? How did people figure out how to build them? In 3D Engineering: Design and Build Your Own Prototypes, young readers tackle real-life engineering problems by figuring out real-life solutions. Kids apply science and math skills to create prototypes for bridges, instruments, alarms, and more. Prototypes are preliminary models used by engineers—and kids—to evaluate ideas and to better understand how things work. Engineering design starts with an idea. How do we get to the other side of the river? How do we travel long distances in short times? Using a structured engineering design process, kids learn how to brainstorm, build a prototype, test a prototype, evaluate, and re-design. Projects include designing a cardboard chair to understand the stiffness of structural systems and designing and building a set of pan pipes to experiment with pitch and volume. Creating prototypes is a key step in the engineering design process and prototyping early in the design process generally results in better processes and products. 3D Engineering gives kids a chance to figure out many different prototypes, empowering them to discover the mechanics of the world we know.
The Design of Highway Bridges and the Calculation of Stresses in Bridge Trusses
"This extensive collection of do-it-yourself projects ranges from simple ideas using household materials to sophisticated plans which are unique."--Booklist "[There are] many good projects."--Appraisal "The directions are clear and straightforward."--VOYA From a device that makes sounds waves visible to a unique "pomato" plant, these 100 imaginative and impressive science projects will impress science fair judges and teachers--and astound all the kids in the school. Some of the experiments can be completed quickly, others take more time, thought, and construction, but every one uses readily available materials. Budding Einsteins can make their own plastic, build a working telescope, or choose from a range of ideas in electricity, ecology, astronomy, and other scientific fields.
Timber Bridges
Railing Design for New Truss Bridges
Construction Technology Activities
Bridge Engineering Handbook