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Transportation engineers have used editions of the Highway Capacity Manual (HCM) in their analyses for decades. The HCM is the fundamental reference for concepts, performance measures, and analysis techniques for evaluating the multimodal operation of streets, highways, freeways, and off-street paths. This 7th Edition contains new information, including new planning-level methods for connected and automated vehicles; a completely revised procedure for analyzing two-lane highways; a new procedure for evaluating systems of freeways and arterials with queue spillback; and updated methodologies for pedestrian operations at uncontrolled and signalized crossings. Methods and practices for constructing sophisticated prestressedconcrete structures. Construction of Prestressed Concrete Structures, Second Edition,provides the engineer or construction contractor with a completeguide to the design and construction of modern, high-qualityconcrete structures. This highly practicable new edition of Ben C.Gerwick's classic guide is expanded and almost entirely rewrittento reflect the dramatic developments in materials and techniquesthat have occurred over the past two decades. The first of the book's two sections deals with materials andtechniques for prestressed concrete, including the latest recipesfor high-strength and durable concrete mixes, new reinforcingmaterials and their placement patterns, modern prestressingsystems, and special techniques such as lightweight concrete andcomposite construction. The second section covers application tobuildings; bridges; pilings; and marine structures, includingoffshore platforms, floating structures, tanks, and containments.Special subjects such as cracking and corrosion, repair andstrengthening of existing structures, and construction in remoteareas are presented in the final chapters. For engineers and construction contractors involved in any type ofprestressed concrete construction, this book enables the effectiveimplementation of advanced structural concepts and their economicaland reliable translation into practice. Since the first prestressed concrete bridge was built and launched by Freyssinet in 1941, such structures have soared to greater heights due to computer-aided design and innovative materials. Rosignoli, a consulting engineer practicing in Italy and abroad, distills aesthetic/environmental consciousn The main aim of the book is to evaluate the safety level of Turkish type precast prestressed concrete bridge girders designed according to AASHTO LRFD based on reliability theory. Two types of design truck loading models are taken into account: H30S24-current design live load of Turkey and HL93-design live load model of AASHTO LRFD. The statistical parameters of both load and resistance components are estimated from local data and published data in the literature. The girders are designed according to the requirements of both Service III and Strength I limit states. The reliability indexes are calculated by different methods for both Strength I and Service III limit states. The reliability level of typical girders of Turkey is compared with those of others countries. Different load and resistance factors are intended to achieve the selected target reliability levels. For the studied cases, a set of load factors corresponding to different levels of reliability index are suggested for the two models of truck design loads. Precast prestressed concrete panels have been used as subdecks in bridge construction in Iowa and other states. To investigate the performance of these types of composite slabs at locations adjacent to abutment and pier diaphragms in skewed bridges, a research project which involved surveys of design agencies and precast producers, field inspections of existing bridges, analytical studies, and experimental testing was conducted. The survey results from the design agencies and panel producers showed that standardization of precast panel construction would be desirable, that additional inspections at the precast plant and at the bridge site would be beneficial, and that some form of economical study should be undertaken to determine actual cost savings associated with composite slab construction. Three bridges in Hardin County, Iowa were inspected to observe general geometric relationships, construction details, and to note the visual condition of the bridges. Hairline cracks beneath several of the prestressing strands in many of the precast panels were observed, and a slight discoloration of the concrete was seen beneath most of the strands. Also, some rust staining was visible at isolated locations on several panels. Based on the findings of these inspections, future inspections are recommended to monitor the condition of these and other bridges constructed with precast panel subdecks. Five full-scale composite slab specimens were constructed in the Structural Engineering Laboratory at Iowa State University. One specimen modeled bridge deck conditions which are not adjacent to abutment or pier diaphragms, and the other four specimens represented the geometric conditions which occur for skewed diaphragms of 0, 15, 30, and 40 degrees. The specimens were subjected to wheel loads of service and factored level magnitudes at many locations on the slab surface and to concentrated loads which produced failure of the composite slab. The measured slab deflections and bending strains at both service and factored load levels compared reasonably well with the results predicted by simplified Finite element analyses of the specimens. To analytically evaluate the nominal strength for a composite slab specimen, yield-line and punching shear theories were applied. Yield-line limit loads were computed using the crack patterns generated during an ultimate strength test. In most cases, these analyses indicated that the failure mode was not flexural. Since the punching shear limit loads in most instances were close to the failure loads, and since the failure surfaces immediately adjacent to the wheel load footprint appeared to be a truncated prism shape, the probable failure mode for all of the specimens was punching shear. The development lengths for the prestressing strands in the rectangular and trapezoidal shaped panels was qualitatively investigated by monitoring strand slippage at the ends of selected prestressing strands. The initial strand transfer length was established experimentally by monitoring concrete strains during strand detensioning, and this length was verified analytically by a finite element analysis. Even though the computed strand embedment lengths in the panels were not sufficient to fully develop the ultimate strand stress, sufficient stab strength existed. Composite behavior for the slab specimens was evaluated by monitoring slippage between a panel and the topping slab and by computation of the difference in the flexural strains between the top of the precast panel and the underside of the topping slab at various locations. Prior to the failure of a composite slab specimen, a localized loss of composite behavior was detected. The static load strength performance of the composite slab specimens significantly exceeded the design load requirements. Even with skew angles of up to 40 degrees, the nominal strength of the slabs did not appear to be affected when the ultimate strength test load was positioned on the portion of each slab containing the trapezoidal-shaped panel. At service and factored level loads, the joint between precast panels did not appear to influence the load distribution along the length of the specimens. Based on the static load strength of the composite slab specimens, the continued use of precast panels as subdecks in bridge deck construction is recommended. This book was written to make the material presented in my book, Stahlbetonbrucken, accessible to a larger number of engineers throughout the world. A work in English, the logical choice for this task, had been contemplated as Stahlbetonbrucken was still in its earliest stages of preparation. The early success of Stahlbetonbrucken provided significant impetus for the writing of Prestressed Concrete Bridges, which began soon after the publication of its predecessor. The present work is more than a mere translation of Stahlbetonbrucken. Errors in Stahlbetonbrucken that were detected after publication have been corrected. New material on the relation between cracking in concrete and corrosion of reinforce ment, prestressing with unbonded tendons, skew-girder bridges, and cable-stayed bridges has been added. Most importantly, however, the presentation of the material has been extensively reworked to improve clarity and consistency. Prestressed Concrete Bridges can thus be regarded as a thoroughly new and improved edition of its predecessor. Work accomplished over the 14.5 year life of this project is summarized, and the reports published as part of the study are referenced. Implementation of the results of the study has already been accomplished in two areas. The current loss-of-prestress provisions in the AASHTO Bridge Specification are based on recommendations prepared as part of the work of this project. Illinois DOT has stopped using span diaphragms in prestressed concrete highway bridges as a result of recommendations based on another phase of the study. The work be divided into three relatively separate phases. The first phase was the installation of deformation measuring instrumentation in three in-service bridges, the gathering of data, and the development of analysis procedures that enabled the data to be interpreted. The second phase involved the construction of relatively small scale prestressed bridge components, and their use to provide data to help confirm some information developed in the field study. The models were later tested to failure, and additional information about overload behavior was gained. The third phase was a study of the effects of span diaphragms on moment distributions in bridges, and it was concluded that these members were cost-ineffective and that their use should be discontinued. The spans of precast prestressed concrete bridge girders have become longer to provide more economical and safer transportation structures. As the spans have increased, so has the depth of the girders which in turn have increased the slenderness of the girders. Slenderness in a beam or girder would increase the likelihood that a stability failure would occur. Stability failures could pose a danger to construction personnel due to the sudden nature in which a stability failure would occur. Furthermore, stability failures of prestressed concrete girders during construction would cause a detrimental economic impact due to the costs associated with the failure of the girder, the ensuing construction delays, damage to construction equipment and potential closures to highways over which the bridge was being constructed. &Quot;This book is an essential purchase for all those involved in bridge construction and innovative building techniques, such as bridge owners, design offices, bridge consultants, and construction equipment suppliers."--BOOK JACKET. For this research, prestress losses were monitored in six HPC bridge girders. These measured losses were compared to predicted losses according to four sources. Prestress loss predictive methods considered for this research were: 1- AASHTO LRFD 2004, 2- AASHTO LRFD 2004 Refined, 3- AASHTO LRFD 2007, and 4- AASHTO LRFD Lump Sum method. On the other hand, the camber prediction methods used in the present research were: 1- Time dependent method described in NCHRP Report 496, 2- PCI multiplier method, and 3- Improved PCI Multiplier method. For the purpose of this research, long-term prestress losses were monitored in select girders from Bridge 669 located near Farmington, Utah. Bridge 669 is a three-span prestress concrete girder bridge. The three spans have lengths of 132.2, 108.5, and 82.2 feet long, respectively. Eleven AASHTO Type VI precast prestressed girders were used to support the deck in each span. The deflection of several girders from a three-span, prestressed, precast concrete girder bridge was monitored for 3 years. Fifteen bridge girders were fabricated for the three span-bridge. Ten girders from the exterior spans had span length of 80 feet, and five girders from the middle span had span length of 137 feet. From the results of this research, in both the 82- and 132-foot-long, the AASHTO LRFD 2004 Refined Method does a better job predicting the prestress loss and it can be concluded that all the prediction methods do a better job predicting the loss for the larger girders. The Lump Sum method predicted very accurately the long term prestress loss for the 132-foot-long girders. "TRB's National Cooperative Highway Research Program (NCHRP) Report 733: High-Performance/High-Strength Lightweight Concrete for Bridge Girders and Decks presents proposed changes to the American Association of State Highway and Transportation Officials' Load and Resistance Factor Design (LRFD) bridge design and construction specifications to address the use of lightweight concrete in bridge girders and decks. The proposed specifications are designed to help highway agencies evaluate between comparable designs of lightweight and normal weight concrete bridge elements so that an agency's ultimate selection will yield the greatest economic benefit. The attachments contained in the research agency's final report provide elaborations and detail on several aspects of the research. Attachments A and B provide proposed changes to AASHTO LRFD bridge design and bridge construction specifications, respectively; these are included in the print and PDF version of the report. Attachments C through R are available for download below. Attachments C, D, and E contain a detailed literature review, survey results, and a literature summary and the approved work plan, respectively. Attachment C; Attachment D ; Attachment E; Attachments F through M provide details of the experimental program that were not able to be included in the body of this report. Attachment F; Attachment G; Attachment H; Attachment I; Attachment J; Attachment K; Attachment L; Attachment M. Attachments N through Q present design examples of bridges containing lightweight concrete and details of the parametric study. Attachment N; Attachment O; Attachment P; Attachment Q. Attachment R is a detailed reference list."--Publication information. An extensively illustrated handbook summarizing the current state of the art of design and construction methods for all types of segmental bridges. Covers construction methodology, design techniques, economics, and erection of girder type bridges; arch, rigid frame, and truss bridges; cable-stayed bridges; and railroad bridges. At head of title: National Cooperative Highway Research Program. Prestressed concrete decks are commonly used for bridges with spans between 25m and 450m and provide economic, durable and aesthetic solutions in most situations where bridges are needed. Concrete remains the most common material for bridge construction around the world, and prestressed concrete is frequently the material of choice. Extensively illustrated throughout, this invaluable book brings together all aspects of designing prestressed concrete bridge decks into one comprehensive volume. The book clearly explains the principles behind both the design and construction of prestressed concrete bridges, illustrating the interaction between the two. It covers all the different types of deck arrangement and the construction techniques used, ranging from in-situ slabs and precast beams; segmental construction and launched bridges; and cable-stayed structures. Included throughout the book are many examples of the different types of prestressed concrete decks used, with the design aspects of each discussed along with the general analysis and design process. Detailed descriptions of the prestressing components and systems used are also included. Prestressed Concrete Bridges is an essential reference book for both the experienced engineer and graduate who want to learn more about the subject. Examining the fundamental differences between design and analysis, Robert Benaim explores the close relationship between aesthetic and technical creativity and the importance of the intuitive, more imaginative qualities of design that every designer should employ when designing a structure. Aiding designers of concrete bridges in developing an intuitive understanding of structural action, this book encourages innovation and the development of engineering architecture. Simple, relevant calculation techniques that should precede any detailed analysis are summarized. Construction methods used to build concrete bridge decks and substructures are detailed and direct guidance on the choice and the sizing of different types of concrete bridge deck is given. In addition guidance is provided on solving recurring difficult problems of detailed design and realistic examples of the design process are provided. This book enables concrete bridge designers to broaden their scope in design and provides an analysis of the necessary calculations and methods. Prestressing concrete technology is critical to understanding problems in existing civic structures including railway and highway bridges; to the rehabilitation of older structures; and to the design of new high-speed railway and long-span highway bridges. Analysis and Design of Prestressed Concrete delivers foundational concepts, and the latest research and design methods for the engineering of prestressed concrete, paying particular attention to crack resistance in the design of high-speed railway and long-span highway prestressed concrete bridges. The volume offers readers a comprehensive resource on prestressing technology and applications, as well as the advanced treatment of prestress losses and performance. Key aspects of this volume include analysis and design of prestressed concrete structures using a prestressing knowledge system, from initial stages to service; detailed loss calculation; time-dependent analysis on cross-sectional stresses; straightforward, simplified methods specified in codes; and in-depth calculation methods. Sixteen chapters combine standards and current research, theoretical analysis, and design methods into a practical resource on the analysis and design of prestressed concrete, as well as presenting novel calculation methods and theoretical models of practical use to engineers. Presents a new approach to calculating prestress losses due to anchorage seating Provides a unified method for calculating long-term prestress loss Details cross-sectional stress analysis of prestressed concrete beams from jacking to service Explains a new calculation method for long-term deflection of beams caused by creep and shrinkage Gives a new theoretical model for calculating long-term crack width Developed to comply with the fifth edition of the AASHTO LFRD Bridge Design Specifications [2010]--Simplified LRFD Bridge Design is "How To" use the Specifications book. Most engineering books utilize traditional deductive practices, beginning with in-depth theories and progressing to the application of theories. The inductive method in the book us Examining the fundamental differences between design and analysis, Benaim explores the close relationship between aesthetic and technical creativity and the importance of the intuitive, more imaginative qualities of design that should be employed by every designer when designing a structure. Aiding designers of concrete bridges in developing an intuitive understanding of structural action, this book thereby encourages innovation and the development of engineering architecture. Simple, relevant calculation techniques that should precede any detailed analysis are summarized. Construction methods.