In Prestressed Concrete Bridge Construction

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Structural Performance of a Full-depth Precast Concrete Bridge Deck System - Thomas Mander 2010
Throughout the United States accelerated bridge construction is becoming increasingly popular to meet growing transportation demands while keeping construction time and costs to a minimum. This research focuses on eliminating the need to form full-depth concrete bridge deck overhangs, accelerating the construction of concrete bridge decks, by using full-depth precast prestressed concrete deck panels. Full-depth precast overhang panels in combination with cast-in-place (CIP) reinforced concrete are experimentally and analytically investigated to assess the structural performance. Experimental loaddeformation behavior for factored AASHTO LRFD design load limits is examined followed by the collapse capacity of the panel-to-panel seam that exists in the system. Adequate strength and stiffness of the proposed full-depth panels deem the design safe for implementation for the Rock Creek Bridge in Fort Worth, Texas. New failure theories are derived for interior and exterior bridge deck spans as present code-based predictions provide poor estimates of the ultimate capacity. A compound shear-flexure failure occurs at interior bays between the CIP topping and stay-in-place (SIP) panel. Overhang failure loads are characterized as a mixed failure of flexure on the loaded panel and shear at the panel-to-panel seam. Based on these results design recommendations are presented to optimize the reinforcing steel layout used in concrete bridge decks.
DESIGNING & CONSTRUCTING PRESTRESSED BRI - JIRI STRASKY 2020-12-29

Incorporating Shrinkage Effects in FE Modeling of Prestressed Concrete Bridge - Dhara Purani 2013
Right from the inception of the implementation of prestressed concrete in the bridge construction field, it has been very popular. Even though this type of bridges has big advantages, cracking is a major problem. The cracking event, due to its detrimental effects on the structure is the most objectionable problem. In cracking shrinkage plays a very significant role. This implies that the study of shrinkage is essential to study the phenomenon of cracking. Due to many variables responsible for deck cracking, it is very difficult to study the overall effect of these variegated factors taken in the consideration at a time. This thesis aims to confluence as many such aspects as possible in a single plane of consideration with the help of Finite Element software namely ABAQUS. The goal of this research is to study shrinkage, shrinkage effects, and factors affecting the shrinkage and ultimately to incorporate the shrinkage effects in Finite Element Modeling. Here the study is constrained to Prestressed Concrete Bridge. Thus, the research is carried to incorporate the shrinkage effects in FE Modeling of Prestressed Concrete Bridge. This is a difficult task as many finite element programs do not have pre-programmed methods for simulating the time dependent properties of concrete. Therefore, it is necessary to develop these methods. This study concentrates on trying to simulate the behavior of a simple span bridge as a means of developing the basic analytical method. In the research Abaqus has been selected and the selection has been justified for the purpose of analyzing time dependent effects in bridges. A parametric study has been carried out with a view to identifying the effects of various parameters of shrinkage in a structure. The effects of the parameters such as length of the span, girder spacing, deck thickness and modulus of elasticity of girder have been analyzed with the help of bridges modeled in Abaqus. The parametric study concludes that shrinkage strain increases with increase in length and spacing of girder. The shrinkage strain decreases with increase in compressive strength of girder and deck thickness.
Assessing Pre-Tensioned Reinforcement Corrosion Within the New Zealand Concrete Bridge Stock - Allan Rhys Rogers 2016
Precast pre-tensioned concrete bridge construction became common in New Zealand in the 1950s and a large number of pre-tensioned concrete bridges were constructed between 1953 and 1980. These bridges do not meet today's durability requirements and as such many are at risk of chloride induced pre-tensioned reinforcement corrosion. This deterioration can be difficult to detect and has immediate structural implications, so identification of at-risk structures is critical for bridges to achieve their required service lives. This study aimed to expand on previous research into the deterioration of pre-tensioned I-Beam bridges, to obtain an accurate assessment of the severity, prevalence and distribution of corrosion risk to all of New Zealand's pre-tensioned prestressed concrete bridge assets. The NZ State Highway pre-tensioned bridge stock was analysed, and pre-tensioned bridges were categorised by construction era and beam type. The number of bridges in each category was assessed, and standard drawings and typical details are presented for common bridge types in New Zealand. A computer based distribution and exposure classification tool was developed that draws from international best practice asset management techniques and allows remote assessment of both individual bridges, and of the bridge stock as a whole. The exposure classification of each pre-tensioned concrete bridge on the State Highway network was remotely estimated using the tool, and these results were used to further categorise the bridge stock. A representative sample of 30 bridges was selected and subjected to a non-destructive testing regime. Trends identified in the inspections were applied back to the other bridges using the construction eras and beam types identified in this thesis. A key objective of this study was to identify pre-tensioned bridges in the wider bridge stock that were likely to be at risk of chloride induced corrosion, and recommend that they each be subjected to more thorough investigations to quantify and manage the corrosion risk to each structure. The tools developed in this thesis were intended to be used by asset managers and bridge inspectors in future assessments of New Zealand pre-tensioned bridges. The construction eras and beam types developed can be used to identify standard bridge plans and other design documents relevant to a given bridge, and to quickly discern general information about the structure. The distribution and exposure classification tool can be used to remotely assess bridges using road level and satellite photography. This thesis provided insight into the condition and durability of the New Zealand pre-tensioned concrete bridge stock. It is anticipated that the information presented will be used to identify at-risk bridges nationwide so that inspection schedules and mitigation or remediation works can be designed and performed effectively.
Continuous Prestressed Concrete Girder Bridges - Mary Beth Deisz Hueste 2012

Construction and Design of Prestressed Concrete Segmental Bridges - Walter Podolny 1982-05-11
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.
Precast segmental bridges - fib Fédération internationale du béton 2017-08-01
The concept of precast segmental bridges is not new: the first application documented was from the mid-1940s, designed by Eugene Freyssinet and built over the river Marne near Luzancy in France, between 1944 and 1946. Although innovative, it also contained traditional wet concrete joints between the members. The impressive breakthrough came slightly later with the introduction of match-cast joints by Jean Muller, first for a bridge near Buffalo (USA) in 1952, and later for a bridge across the River Seine at Choisy le Roi near Paris in 1962. This opened the way for a large number of new developments in terms of design, production approaches

and construction techniques, and precast prestressed concrete segmental construction became rapidly one of the most efficient and successful bridge construction methods all over the world. These developments are still evolving, but the interaction between design, production and construction is a critical factor for success: the interaction creates opportunities to optimise the scheme, but at the same time is crucial to ensure safety, especially during construction, when large weights are moved, placed and secured, frequently at substantial heights. Engineers of all disciplines involved should interact during the development and realisation of precast segmental bridge (PSB) schemes, to conclude the optimum method statement and consequently check all the intermediate steps of the method statement in terms of stress, stiffness, stability, production and constructability. With the ongoing development of the PSB concept, and consequently moving limits in terms of dimensions, it was concluded to be appropriate to develop a Guide to good practice for the PSB construction method. The present report was developed by an integrated team of engineers with roots in design, structural engineering, production and construction, and provides a valuable source of knowledge, experience, recommendations and examples, with particular emphasis on the fib Model Code for Concrete Structures 2010 and fib Bulletins 20, 33, 48 and 75. I would like to thank all the members of Task Group 1.7, all the individual contributors from outside Task Group 1.7, and the reviewers of the Technical Council of the fib for their contribution to this Guide to good practice. In particular, I would like to thank Gopal Srinivasan and Marcos Sanchez, who, apart from their own contributions, did the final editorial work for this bulletin.

State-of-the-art Report on Precast Concrete Systems for Rapid Construction of Bridges - 2005

Composite Precast Prestressed Concrete Bridge Slabs - R.E. Abendroth 1991

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.

Behavior of Prestressed Concrete Bridges with Closure Pour Connections and Diaphragms - Gercelino Ramos 2019

Accelerated Bridge Construction (ABC) has gained substantial popularity in new bridge construction and bridge deck replacement because it offers innovative construction techniques that result in time and cost savings when compared to traditional bridge construction practice. One technology commonly implemented in ABC to effectively execute its projects is the use of prefabricated bridge components (precast/prestressed bridge components). Precast/prestressed bridge components are fabricated offsite or near the site and then connected on-site using small volume closure pour connections. Diaphragms are also commonly used to strengthen the connection between certain prefabricated components used in ABC, such as beam elements. Bridges containing closure pour connections and diaphragms can be designed using AASHTO LRFD live-load distribution factor formulas under the condition that the bridge must be sufficiently connected. However, these formulas were developed using analytical models that did not account for the effects of closure pours and diaphragms on live-load distribution. This research study investigates live-load distribution characteristics of precast/prestressed concrete bridges with closure pour connections and diaphragms. The investigation was conducted using finite element bridge models with closure pour joints that were calibrated using experimental data and different configuration of diaphragms. The concrete material used for the closure pour connections was developed as part of a larger project intended to develop high early-strength concrete mixtures that specifically reach strength in only 12 hours, a critical requirement for ABC projects.

Stability of Precast Prestressed Concrete Bridge Girders Considering Imperfections and Thermal Effects - Jonathan B. Hurff 2010

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.

Precast Concrete Bridges - fib Fédération internationale du béton 2004-01-01

This report was drafted by fib Task Group 6.4, Precast bridges: José Calavera (Convenor, Spain) André De Chefdebien (CERIB, France), David Fernández-Ordóñez (Prefabricados Castelo, S.A., Spain, Secretary), Antonello Gasperi (Consulting engineer, Italy), Jorge Ley (INTEMAC, Spain), Fritz Mönnig (Prof. Bechert & Partner, Germany), Pierre Passeman (CERIB, France), C. Quartel (Spanbeton BV, The Netherlands), Ladislav Sasek (VPU DECO Praha, Czech Republic), George Tootell (Buchan Concrete Ltd., UK), Arnold Van Acker (Belgium)

Precast Concrete Elements for Accelerated Bridge Construction: Laboratory testing, field testing, and evaluation of a precast concrete bridge: Madison County bridge - Terry J. Wipf 2009

In July 2006, construction began on an accelerated bridge project in Boone County, Iowa that was composed of precast substructure elements and an innovative, precast deck panel system. The superstructure system consisted of full-depth deck panels that were prestressed in the transverse direction, and after installation on the prestressed concrete girders, post-tensioned in the longitudinal direction. Prior to construction, laboratory tests were completed on the precast abutment and pier cap elements. The substructure testing was to determine the punching shear strength of the elements. Post-tensioning testing and verification of the precast deck system was performed in the field. The forces in the tendons provided by the contractor were verified and losses due to the post-tensioning operation were measured. The stress (strain) distribution in the deck panels due to the post-tensioning was also measured and analyzed. The entire construction process for this bridge system was documented. Representatives from the Boone County Engineers Office, the prime contractor, precast fabricator, and researchers from Iowa State University provided feedback and suggestions for improving the constructibility of this design.
Redistribution of Stresses in Segmentally Erected Prestressed Concrete Bridges - M. A. Ketchum 1986

Bridge Launching - Marco Rosignoli 2002
&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.
Accelerated Bridge Construction - Mohiuddin Ali Khan 2014-08-12
The traveling public has no patience for prolonged, high cost construction projects. This puts highway construction contractors under intense pressure to minimize traffic disruptions and construction cost. Actively promoted by the Federal Highway Administration, there are hundreds of accelerated bridge construction (ABC) construction programs in the United States, Europe and Japan. Accelerated Bridge Construction: Best Practices and Techniques provides a wide range of construction techniques, processes and technologies designed to maximize bridge construction or reconstruction operations while minimizing project delays and community disruption. Describes design methods for accelerated bridge substructure construction; reducing foundation construction time and methods by using pile bents Explains applications to steel bridges, temporary bridges in place of detours using quick erection and demolition Covers design-build systems' boon to ABC; development of software; use of fiber reinforced polymer (FRP) Includes applications to glulam and sawn lumber bridges, precast concrete bridges, precast joints details; use of lightweight aggregate concrete, aluminum and high-performance steel
Field Investigation of Prestressed Reinforced Concrete Highway Bridges - William Leo Gamble 1980
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.
Construction of Prestressed Concrete Structures - Ben C. Gerwick, Jr. 1997-02-13
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.
Prestressed Concrete Bridges - Nigel R. Hewson 2003
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.
Design and Construction Integration of a Continuous Precast Prestressed Concrete Bridge System - Subha Lakshmi Kumar Roy 2013
An effective, viable design solution for the elevated viaduct guideway for Universal Freight Shuttle (UFS) system championed by Texas Transportation Institute (TTI) is presented. The proposed precast elevated UFS bridge system is analyzed for the operational vehicular loading as provided by TTI and a number of design alternatives for the various bridge components are provided. These includes: the design of the fully precast deck panels for long continuous spans, design of the shear connectors resisting interface shear at bridge deck-girder interface, design of structurally efficient and cost-effective trough girders and its design alternative with I-girders, and economic and long-term serviceable design of bridge piers. A literature review and study of the existing precast bridges is presented for the state-of-the-art and practice, design specifications and publications by AASHTO, State Department of Transportation and other agencies. These existing systems are refined to determine the most appropriate specification for the proposed bridge components by integrating the planning, design, fabrication and construction techniques to ensure high precision freight shuttle movement, construction feasibility, safety, life-cycle cost, durability and serviceability requirements. The design concept presented is a deviation from the conventional railways and highways design. The best practices and specifications of AASHTO and AREMA are combined suitably in this research to suit the major requirements of the project. A combination of the design philosophy with appropriate construction techniques has been blended to devise a system which is efficient for offsite manufacture of components for construction of the bridge and adaptable to the different bridge configurations. Based on the design results, it is found that precast concrete deck panels in combination with precast, prestressed concrete trough girders provides the most efficient superstructure solution for this project. The Damage Avoidance Design for the precast bridge piers along with the precast superstructure provides a system with comparable structural performance along with other benefits such as long term serviceability, economical sections, practically transportable units, modular simplicity for relocation as desired and ability to offer space for commercial usage. The steps for construction of the bridge is schematically presented and sequentially explained. The electronic version of this dissertation is accessible from http://hdl.handle.net/1969.1/150928
Selective Bibliography on Prestressed Concrete Bridges - 1957

Techniques for Measuring Existing Long-term Stresses in Prestressed Concrete Bridges - 1990
Various stress measurement techniques were evaluated in this study. The evaluation included a state-of-the-art review of existing techniques and analytical studies of these techniques. Based on analytical results, the flat-jack direct stress measurement technique was evaluated in laboratory and field tests. Based on these tests, a manual of instruction was written to describe the equipment and procedures required to obtain reliable direct stress measurement. This is the Executive Summary which summarizes the findings of this research project.
Construction and Testing of a 1/24-scale Continuous Composite Prestressed Concrete Bridge Beam - Thomas M. Davis 1968

Construction Par Encorbellement Des Ponts en Béton Précontraint - Jacques Mathivat 1983

An Introduction to Upgrading Concrete Bridges for Construction Managers - J. Paul Guyer, P.E., R.A. 2022-05-25
Introductory technical guidance for construction managers interested in upgrade construction for concrete bridges. Here is what is discussed: 1. GENERAL UPGRADE METHODS, 2. STRENGTHEN INDIVIDUAL MEMBERS, 3. PRESTRESSED CONCRETE MEMBERS, 4. PREVENTIVE MAINTENANCE, 5. CRACK, SPALL AND JOINT REPAIR.
FULL-RANGE BEHAVIOUR OF PRESTR - Xiachun Chen 2017-01-26
This dissertation, "Full-range Behaviour of Prestressed Concrete Bridges With Corrugated Steel Webs" by Xiachun, Chen, □□□, was obtained from The University of Hong Kong (Pokfulam, Hong Kong) and is being sold pursuant to Creative Commons: Attribution 3.0 Hong Kong License. The content of this dissertation has not been altered in any way. We have altered the formatting in order to facilitate the ease of printing and reading of the dissertation. All rights not granted by the above license are retained by the author. Abstract: Bridge engineers and researchers have been looking for efficient structural forms under the performance-based concept to satisfy various attributes, including serviceability, safety, economy, constructability, durability, etc. Prestressed concrete bridges with corrugated steel webs have emerged as one of the promising bridge forms due to their remarkable advantages such as efficient prestressing of concrete, high buckling strength of steel webs and lightness. In 1986, the first bridge of this type, Cognac Bridge, was built in France. Its successful application and significant advantages over conventional prestressed concrete bridges have prompted researchers and construction companies in various countries to get involved in this new form of composite structure. However, the full-range behaviour of the bridges covering both the service and failure stages is rather complicated, and has not been systematically studied. In view of the different behaviour of components and the large shear deformation of corrugated steel webs with negligible axial stiffness, the assumption that plane sections remain plane is no longer valid and therefore the classical Euler-Bernoulli and Timoshenko beam models may not be applicable. To study the structural behaviour of prestressed concrete bridges with corrugated steel webs, numerical and experimental investigations were carried out. A sandwich beam theory was developed to investigate both the static and dynamic behaviour numerically. In addition, a modified Timoshenko beam model was developed for linearly elastic analysis of static service behaviour, which provides a convenient alternative for design purpose. In the development of numerical models, special emphasis was placed on the modelling of corrugated steel webs, external prestressing tendons, diaphragms, and interaction between web shear deformation and local flange bending. The numerical models were verified by tests. Using the numerical models proposed, the static service behaviour, dynamic properties and long-term behaviour were studied. Some parametric studies were carried out to further explore their structural behaviour. The sectional ductility, deformability and strength were evaluated by nonlinear analysis taking into account the actual stress-strain curves and path-dependence of materials. The numerical results obtained were compared with experimental results for verification. A parametric study was then undertaken to clarify the effects of various parameters. In the design of this type of bridges, both the ultimate load and ductility should be examined, which requires the estimation of full-range structural behaviour. The sandwich beam model was extended for analysis of the full-range behaviour considering geometric and material nonlinearities. With a nonlinear kinematical theory, complete description of the nonlinear interaction between the external tendons and the bridge was obtained. The numerical model proposed was also verified by experiments. The failure mechanisms were studied experimentally and numerically for more accurate evaluation of safety-related attributes such as ultimate load, ductility and deformability. The formation of plastic hinge and its size were also studied thoroughly in view of their importance in the prediction of full-range behaviour. A simplified method to predict the full-range behaviour was also proposed based on the concept o
Prestressed Concrete Segmental Bridges - 1979

Advanced Composites in Bridge Construction and Repair - Yail Jimmy Kim 2014-05-16
Advanced composite materials for bridge structures are recognized as a promising alternative to conventional construction materials such as steel. After an introductory overview and an assessment of the characteristics of bonds between composites and quasi-brittle structures, Advanced Composites in Bridge Construction and Repair reviews the use of advanced composites in the design and construction of bridges, including damage identification and the use of large rupture strain fiber-reinforced polymer (FRP) composites. The second part of the book presents key applications of FRP composites in bridge construction and repair, including the use of all-composite superstructures for accelerated bridge construction, engineered cementitious composites for bridge decks, carbon fiber-reinforced polymer composites for cable-stayed bridges and for repair of deteriorated bridge substructures, and finally the use of FRP composites in the sustainable replacement of ageing bridge superstructures. Advanced Composites in Bridge Construction and Repair is a technical guide for engineering professionals requiring an understanding of the use of composite materials in bridge construction. Reviews key applications of fiber-reinforced polymer (FRP) composites in bridge construction and repair Summarizes key recent research in the suitability of advanced composite materials for bridge structures as an alternative to conventional construction materials
Bridge Engineering Handbook - Wai-Fah Chen 2019-09-11
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."
Modern Prestressed Concrete Highway Bridge Superstructures - James R. Libby 1976

Construction of Bridge Decks with Precast, Prestressed Concrete Deck Planks - Tessa H. Volle 2002

Continuous Prestressed Concrete Girder Bridges - Mary Beth Deisz Hueste 2016
The Texas Department of Transportation designs typical highway bridge structures as simple span systems using standard precast, pretensioned girders. Spans are limited to about 150 ft due to weight and length restrictions on transporting the precast girder units from the prestressing plant to the bridge site. Such bridge construction, while economical from an initial cost point of view, may become somewhat limiting when longer spans are needed. This project focused on developing additional economical design alternatives for longer span bridges with main spans ranging from 150-300 ft, using continuous precast, prestressed concrete bridge structures with in-span splices. Phase 1 of this study focused on evaluating the current state-of-the-art and practice relevant to continuous precast concrete girder bridges and recommending suitable continuity connections for typical Texas bridge girders; the findings are documented in the Volume 1 project report. This report summarizes Phase 2 of the research including detailed design examples for shored and partially shored construction, results of a parametric design study, and results of an experimental program that tested a full-scale girder containing three splice connections. The parametric design study indicated that for bridges spanning from 150-300 ft, continuous precast, prestressed concrete girder bridges with in-span splices can provide an economical alternative to steel girder bridges and segmental concrete box girder construction. The tested splice connections performed well under service level loads. However, the lack of continuity of the pretensioning through the splice connection region had a significant impact on the behavior at higher loads approaching ultimate conditions. Improved connection behavior at ultimate conditions is expected through enhanced connection details. Recommendations for design of continuous spliced precast girders, along with several detailing suggestions are discussed in the report.
The Incremental Launching Method in Prestressed Concrete Bridge Construction - VSL International 1977

The Free Cantilevering Method in Prestressed Concrete Bridge Construction - VSL International 1978

Precast Concrete Elements for Accelerated Bridge Construction: Laboratory testing of full-depth precast, prestressed concrete deck panels : Boone County bridge - Terry J. Wipf 2009
Also available via the Internet.

Prestressed Concrete Bridges - Christian Menn 1990-11-01
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.

Launched Bridges - Marco Rosignoli 1998
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

Innovative Bridge Construction Program: Implementation of Full-Depth Bridge Deck Panels in Indiana - Robert J. Frosch 2009-11-01
This research evaluates the use of precast, prestressed bridge deck panels on new and existing precast, prestressed concrete girders. The evaluation focuses on the ease of construction and the ability of the system to develop composite action with the concrete girders. A system developed by the Connecticut Department of Transportation (CDOT) and Precast/Prestressed Concrete Institute New England Region (PCINER) was chosen for testing from available systems because it is representative of the current geometry of precast bridge deck panels. The CDOT system was evaluated in a series of large scale tests in which the panels were placed on a 40 ft prestressed concrete girder and subjected to three point loading. The CDOT system is compared to a new system developed as part of the research program. The new system addresses durability and ease of construction issues that are problematic with current joint details. The strength and geometry of both the current and new joint details are evaluated and compared in a series of direct shear tests. A final, large scale specimen was designed, constructed, and loaded to evaluate the new system. It was concluded that the behavior of the new system is comparable to that of the CDOT system. In addition, the new system is easy to construct and minimizes deck penetrations, thereby enhancing durability. This research has the potential to impact the way in which the aging highway system is rehabilitated and replaced by reducing the associated time and costs of construction while decreasing disruption to the traveling public.

Prestressed Concrete Bridges - Christian Menn 2012-12-06
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.

The Design of Prestressed Concrete Bridges - Robert Benaim 2007-12-06
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.