

Yield Line Analysis Of Slabs

Structural analysis is the corner stone of civil engineering and all students must obtain a thorough understanding of the techniques available to analyse and predict stress in any structure. This text provides the student with a comprehensive introduction to all types of structural and stress analysis. Starting from an explanation of the basic principles of statics, normal and shear force and bending moments and torsion. It goes on to examine the different structures in which consideration of these is paramount, from simple pin joints to suspension cables. The properties of materials are outlined and all aspects of beam theory are examined in full. Finally the author discusses the key area of instability in structures. Virtually no prior knowledge of structures is assumed and students requiring an accessible and comprehensive insight into stress analysis will find no better book available.

This E. & F. N. Spon title is now distributed by Routledge in the US and Canada. This book was the first attempt to establish a simple formulae for the calculation of various slab types. A large number of examples are included.

This highly successful textbook has been comprehensively revised for two main reasons: to bring the book up-to-date and make it compatible with BS8110 1985; and to take into account the increasing use made of microcomputers in civil engineering. An important new chapter on microcomputer applications has been added.

Structural analysis is the corner stone of civil engineering and all students must obtain a thorough understanding of the techniques available to analyse and predict stress in any structure. The new edition of this popular textbook provides the student with a comprehensive introduction to all types of structural and stress analysis, starting from an explanation of the basic principles of statics, normal and shear force and bending moments and torsion. Building on the success of the first edition, new material on structural dynamics and finite element method has been included. Virtually no prior knowledge of structures is assumed and students requiring an accessible and comprehensive insight into stress analysis will find no better book available. Provides a comprehensive overview of the subject providing an invaluable resource to undergraduate civil engineers and others new to the subject Includes numerous worked examples and problems to aide in the learning process and develop knowledge and skills Ideal for classroom and training course usage providing relevant pedagogy

This text primarily analyses different methods of design of concrete structures as per IS 456: 2000 (Plain and Reinforced Concrete—Indian Standard Code of Practice, 4th revision, Bureau of Indian Standards). It gives greater emphasis on the limit state method so as to illustrate the acceptable limits for the safety and serviceability requirements of structures. Besides dealing with yield line analysis for slabs, the book explains the working stress method and its use for designing reinforced concrete tension members, theory of redistribution of moments, and earthquake resistant design of structures. This well-structured book develops an effective understanding of the theory through numerous solved problems, presenting step-by-step calculations. The use of SP-16 (Design Aids for Reinforced Concrete to IS: 456–1978) has also been explained in solving the problems. KEY FEATURES : Instructional Objectives at the beginning of the chapter highlight important concepts. Summary at the end of the chapter to help student revise key points. Sixty-nine solved illustrative examples presenting step-by-step calculations. Chapter-end exercises to test student's understanding of the concepts. Forty Tests to enable students to gauge their preparedness for actual exams. This comprehensive text is suitable for undergraduate students of civil engineering and architecture. It can also be useful to professional engineers.

This established textbook sets out the principles of limit state design and of its application to reinforced and prestressed concrete members and structures. It will appeal both to students and design engineers. The fourth edition incorporates information on the recently introduced British Standard Code of practice for water retaining structures BS8007. The authors have also taken the opportunity of making minor revisions, generally based on the recommendations of BS8110.

Yield line theory offers a simplified nonlinear analytical method that can determine the ultimate bending capacity of flat reinforced concrete planes subject to distributed and concentrated loads. Alternately, yield line theory, combined with hinge rotation limits can determine the energy absorption capacity of plates subject to impulsive and impact loads. This method is especially useful in evaluating existing structures that cannot be qualified using conservative simplifying analytical assumptions. Typical components analyzed by yield line theory are basements, floor and roof slabs subject to vertical loads along with walls subject to out of plane wall loads. One limitation of yield line theory is that it is difficult to evaluate some mechanisms; this is aggravated by the complex geometry and reinforcing layouts commonly found in practice. A yield line evaluation methodology is proposed to solve computationally tedious yield line mechanisms. This methodology is implemented in a small PC based computer program that allows the engineer to quickly evaluate multiple yield line mechanisms.

The yield line analysis method is used extensively throughout the blast design and analysis community to determine the strength of reinforced concrete structural elements to resist blast overpressures. Technical literature has long been available that describes the yield line method of analysis and explains how to derive the necessary analysis equations for a structural element such as a wall or a roof. Most presentations of the yield line analysis method deal with common slab configurations, such as one-way spans of varying support conditions or two-way spans that usually consist of a rectangular slab supported along two or more edges. Very little discussion is available on how to analyze slabs with openings, and even less information is available on how to analyze slabs with covered openings. Yet slabs with covered openings, such as blast-resistant doors or windows, are very common structural elements in the explosive safety design community. This paper presents a method by which the yield line analysis method can be used to analyze and design slabs and plates with openings.

This book provides an up-to-date description of the latest procedures for analysis and design of reinforced concrete slabs. It explains the yield line method of analysis and Hillerborg's strip method of design, and discusses the basic North American and British practices.

Advances in Concrete Slab Technology documents the proceedings of the International Conference on Concrete Slabs held at Dundee University on April 3-6, 1979. This book discusses the influence of steel fiber-reinforcement on the shear strength of slab-column connections; sulfur-treated concrete slabs; yield line analysis of orthotropically reinforced exterior panels of flat slab floors; and behavior of flat slab/edge column joints. The design of multiple panel flat slab structures; structural behavior of floor slabs in shear wall buildings; shrinkage and cracking of concrete at early ages; and slab construction for HAB system modules are also elaborated. This text likewise covers the direct finishing of concrete slabs using the early age power grinding technique; application of vacuum dewatering to in-situ slab production; retexturing of concrete slabs; and fatigue resistance of composite precast and in situ concrete floors. This publication is a good reference for students and individuals concerned with the practices and research relating to slab technology.

This enlightening textbook for undergraduates on civil engineering degree courses explains structural design from its mechanical principles, showing the speed and simplicity of effective design from first principles. This text presents good approximate solutions to complex design problems, such as "Wembley-Arch" type structures, the design of thin-walled structures, and long-span box girder bridges. Other more code-based textbooks concentrate on relatively simple member design, and avoid some of the most interesting design problems because code compliant solutions are complex. Yet these problems can be addressed by relatively manageable techniques. The methods outlined here enable quick, early stage, "ball-park" design solutions to be considered, and are also useful for checking finite element analysis solutions to complex problems. The conventions used in the book are in accordance with the Eurocodes, especially where they provide convenient solutions that can be easily understood by students. Many of the topics, such as composite beam design, are straight applications of Eurocodes, but with the underlying theory fully explained. The techniques are illustrated through a series of worked examples which develop in complexity, with the more advanced questions forming extended exam type questions. A comprehensive range of fully worked tutorial questions are provided at the end of each section for students to practice in preparation for closed book exams.

This highly successful textbook has been comprehensively revised for two main reasons: to bring the book up-to-date and make it compatible with BS8110 1985; and to take into account the increasing use made of microcomputers in civil engineering. An important chapter on microcomputer applications has been added.

Yield-line Theory
Yield-line Analysis of Slabs
Yield-line Formulae for Slabs
CRC Press

This book comprises select peer-reviewed proceedings of the International Conference on Recent Developments in Sustainable Infrastructure (ICRDSI) 2019. The topics span over all major disciplines of civil engineering with regard to sustainable development of infrastructure and innovation in construction materials, especially concrete. The book covers numerical and analytical studies on various topics such as composite and sandwiched structures, green building, groundwater modeling, rainwater harvesting, soil dynamics, seismic resistance and control of structures, waste management, structural health monitoring, and geo-environmental engineering. This book will be useful for students, researchers and professionals working in sustainable technologies in civil engineering.

This book discusses design aspects of steel fiber-reinforced concrete (SFRC) members, including the behavior of the SFRC and its modeling. It also examines the effect of various parameters governing the response of SFRC members in detail. Unlike other publications available in the form of guidelines, which mainly describe design methods based on experimental results, it describes the basic concepts and principles of designing structural members using SFRC as a structural material, predominantly subjected to flexure and shear. Although applications to special structures, such as bridges, retaining walls, tanks and silos are not specifically covered, the fundamental design concepts remain the same and can easily be extended to these elements. It introduces the principles and related theories for predicting the role of steel fibers in reinforcing concrete members concisely and logically, and presents various material models to predict the response of SFRC members in detail. These are then gradually extended to develop an analytical flexural model for the analysis and design of SFRC members. The lack of such a discussion is a major hindrance to the adoption of SFRC as a structural material in routine design practice. This book helps users appraise the role of fiber as reinforcement in concrete members used alone and/or along with conventional rebars. Applications to singly and doubly reinforced beams and slabs are illustrated with examples, using both SFRC and conventional reinforced concrete as a structural material. The influence of the addition of steel fibers on various mechanical properties of the SFRC members is discussed in detail, which is invaluable in helping designers and engineers create optimum designs. Lastly, it describes the generally accepted methods for specifying the steel fibers at the site along with the SFRC mixing methods, storage and transport and explains in detail methods to validate the adopted design. This book is useful to practicing engineers, researchers, and students.

This new edition of a highly practical text gives a detailed presentation of the design of common reinforced concrete structures to limit state theory in accordance with BS 8110.

This paper presents several possible yield-line failure mechanisms and the corresponding equations for the ultimate flexural resistance of a slab with a door when subjected to a uniform pressure. The equations are limited to rectangular slabs with openings and are the beginning of an effort at the Naval Civil Engineering Laboratory to develop a comprehensive design procedure for rectangular slabs subjected to blast loads. (Author).

Comprehensive, up-to-date coverage of reinforced concrete slabs—from leading authorities in the field. Offering an essential background for a thorough understanding of building code requirements and design procedures for slabs, Reinforced Concrete Slabs, Second Edition provides a full treatment of today's approaches to reinforced concrete slab analysis and design. Now brought up to date with a wealth of new material on computer optimization, the equivalent frame method, lateral load analysis, and other current topics, the new edition of this classic text begins with a general discussion of slab analysis and design, followed by an exploration of key methods (equivalent frame, direct design, and strip methods) and theories (elastic, lower bound, and yield line theories). Later chapters discuss other important issues, including shear strength, serviceability, membrane action, and fire resistance. Comprehensive and accessible, Reinforced Concrete Slabs, Second Edition appeals to a broad range of readers—from senior and graduate students in civil and architectural engineering to practicing structural engineers, architects, contractors, construction engineers, and consultants.

Structural Concrete discusses the design and analysis of reinforced and prestressed concrete structural components and structures. Each of the eight chapters of the book tackles a specific

area of concern in structural concrete. The text first deals with the serviceability and safety, and then proceeds to the properties of materials and mix designs. The next two chapters cover reinforced concrete beams and slabs. Chapter 5 discusses column and walls, while Chapter 6 tackles reinforced concrete frames and continuous beams and slabs. The next chapter discusses design structures, while the last chapter covers prestressed concrete. The text will be of great use to undergraduate students of civil and structural engineering. Professionals whose work involves concrete technology will also find the book useful.

The Strip Method Design Handbook is a thorough guide to the use of the strip method, developed by Arne Hillerborg, for design of reinforced concrete slabs. The strip method of design is relevant to many types of slabs including rectangular slabs with all sides supported and regular flat slabs with cantilevering parts. The author discusses unevenly distributed loads, concentrated loads and the influence of openings as well as joist floors and prestressed slabs. This book provides a practical guide for the designer demonstrating how to use the strip method in a wide range of design situations specific to a slab type. The method is illustrated throughout with numerical examples and the analysis is rationalised with approximations and formulas for the calculation of design moments.

This book examines alternative design procedures for plain and piled raft foundations. It explores the assumptions that are made in the analysis of soil - structure interaction, together with the associated calculation methods. The book gives many examples of project applications covering a wide range of structural forms and ground conditions.

This book by a renowned structural engineer offers comprehensive coverage of both static and dynamic analysis of plate behavior, including classical, numerical, and engineering solutions. It contains more than 100 worked examples showing step by step how the various types of analysis are performed.

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