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Chapter 1 : ACI in Practice

Ordered the ACI Concrete code and Amazon sent the most current code, ACI Will keep the ACI but had to borrow the ACI for a specific project. Consumers: Be wary of what edition you order and what edition you recieve from Amazon.

Cagley Chairman Basile G. Rabbat Secretary Craig E. Raymond Hays Leslie D. Gene Corley Richard E. Kreger Denis Mitchell John R. Greer Joe Maffei Randall W. Kirk Harman Steven L. The code has been written in such form that it may be adopted by reference in a general building code and earlier editions have been widely used in this manner. Among the subjects covered are: The quality and testing of materials used in construction are covered by reference to the appropriate ASTM standard specifications. Because the ACI Building Code is written as a legal document so that it may be adopted by reference in a general build- ing code, it cannot present background details or suggestions for carrying out its requirements or intent. It is the function of this commentary to fill this need. The commentary discusses some of the considerations of the committee in developing the code with emphasis given to the explanation of new or revised provisions that may be unfamiliar to code users. References to much of the research data referred to in preparing the code are cited for the user desiring to study indi- vidual questions in greater detail. Other documents that provide suggestions for carrying out the requirements of the code are also cited. ACI Committee Reports, Guides, Standard Practices, and Commentaries are intended for guidance in planning, designing, executing, and inspecting construction. This Commentary is intended for the use of individuals who are competent to evaluate the significance and limitations of its content and recommendations and who will accept responsibility for the application of the material it contains. The American Concrete Institute disclaims any and all responsibility for the stated principles. The Institute shall not be liable for any loss or damage arising therefrom. Reference to this commentary shall not be made in contract documents. All rights reserved including rights of reproduction and use in any form or by any means, including the making of copies by any photo process, or by any electronic or mechanical device, printed or written or oral, or record- ing for sound or visual reproduction or for use in any knowledge or retrieval system or device, unless permission in writing is obtained from the copy- right proprietors. Em- phasis is given to the explanation of new or revised provi- sions that may be unfamiliar to code users. In addition, comments are included for some items contained in previous editions of the code to make the present commentary inde- pendent of the commentary for ACI Comments on specific provisions are made under the corresponding chap- ter and section numbers of the code. However, references to some of the research data are provided for those who wish to study the background material in depth. The code is intended to cover all buildings of the usual types, both large and small. Requirements more stringent than the code provisions may be desirable for unusual construction. The code and commentary cannot replace sound engineering knowledge, experience, and judgement. A building code states only the minimum requirements nec- essary to provide for public health and safety. The code is based on this principle. For any structure, the owner or the structural designer may require the quality of materials and construction to be higher than the minimum requirements necessary to protect the public as stated in the code. Howev- er, lower standards are not permitted. The commentary directs attention to other documents that provide suggestions for carrying out the requirements and in- tent of the code. However, those documents and the com- mentary are not a part of the code. The code has no legal status unless it is adopted by the gov- ernment bodies having the police power to regulate building design and construction. Where the code has not been adopt- ed, it may serve as a reference to good practice even though it has no legal status. The code provides a means of establishing minimum standards for acceptance of designs and construction by a legally ap- pointed building official or his designated representatives. The code and commentary are not intended for use in settling dis- putes between the owner, engineer, architect, contractor, or their agents, subcontractors, material suppliers, or testing agen- cies. Therefore, the code cannot define the contract responsibil- ity of each of the parties in usual construction. General references requiring compliance with the code in the job spec- ifications should be avoided since the

contractor is rarely in a position to accept responsibility for design details or construc- tion requirements that depend on a detailed knowledge of the design. Generally, the drawings, specifications and contract documents should contain all of the necessary requirements to ensure compliance with the code. In part, this can be accom- plished by reference to specific code sections in the job speci- fications. It is desirable to have testing and certification programs for the individual parties involved with the execution of work performed in accordance with this code. The ACI Building Code and Commentary are presented in a side-by-side column format, with code text placed in the left column and the corresponding commentary text aligned in the right column. To further distin- guish the Code from the Commentary, the Code has been printed in Helvetica, the same type face in which this paragraph is set. Vertical lines in the margins indicate changes from ACI , including nontechnical changes such as a new section or equation number. This paragraph is set in Times Roman, and all portions of the text exclusive to the Commentary are printed in this type face. Vertical lines in the margins indicate changes from ACI R, including nontechnical changes such as a new section or equation number. For a discussion of code philosophy, see Siess, Chester P. The design aids listed may be obtained from the spon- soring organization. Provides tables and charts for de- sign of eccentrically loaded columns by the Strength Design Method. Provides design aids for use in the engineering de- sign and analysis of reinforced concrete slab systems carry- ing loads by two-way action. Design aids are also provided for the selection of slab thickness and for reinforcement re- quired to control deformation and assure adequate shear and flexural strengths. Provides recommended methods and standards for preparing engineering drawings, typical details, and drawings placing reinforcing steel in rein- forced concrete structures. Separate sections define responsibil- ities of both engineer and reinforcing bar detailer. Describes specific types of con- crete deterioration. It contains a discussion of the mecha- nisms involved in deterioration and the recommended requirements for individual components of the concrete, quality considerations for concrete mixtures, construction procedures, and influences of the exposure environment. Summarizes prac- tical information regarding design of parking structures for durability. It also includes information about design issues re- lated to parking structure construction and maintenance. Provides tabu- lated designs for structural elements and slab systems. De- sign examples are provided to show the basis of and use of the load tables. Tabulated designs are given for beams; square, round and rectangular columns; one-way slabs; and one-way joist construction. The design tables for two-way slab systems include flat plates, flat slabs and waffle slabs. The chapters on foundations provide design tables for square footings, pile caps, drilled piers caissons and cantilevered retaining walls. Other design aids are presented for crack control; and development of reinforcement and lap splices. Provides accepted practices in splicing reinforce- ment. The use of lap splices, mechanical splices, and welded splices are described. Design data are presented for develop- ment and lap splicing of reinforcement. Describes wire fabric material, gives nomenclature and wire size and weight tables. Lists specifications and properties and manufacturing limitations. Book has latest code requirements as code affects welded wire. Also gives development length and splice length tables. Manual contains customary units and soft metric units. Up- dated with current technical fact sheets inserted. The manual, in addition to including ACI provisions and design aids, also in- cludes: In addition, there are tables to compare areas and spac- ings of high-strength welded wire with conventional reinforcing. Pro- vides design tables of column strength in terms of load in kips versus moment in ft-kips for concrete strength of psi and Grade 60 reinforcement. Design examples are in- cluded. Provides load tables for common in- dustry products, and procedures for design and analysis of precast and prestressed elements and structures composed of these elements. Provides design aids and examples. Updates avail- able information on design of connections for both structural and architectural products, and presents a full spectrum of typical details. Provides comprehen- sive coverage of post-tensioning systems, specifications, and design aid construction concepts. Illustrates application of the code requirements for design of one-way and two-way post-tensioned slabs. Detailed design examples are presented.

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Chapter 2 : building code requirements for structural concrete (aci) and commentary (aci r)

The code portion of this document covers the proper design and construction of buildings of structural concrete. The code has been written in such form that it may be adopted by reference in a general building code and earlier editions have been widely used in this manner.

Show Context Citation Context The result of analyzing ultimate bearingscapacity, are shown in Table 2. About built-in spiral steel CFST ,based on the design ofsconcrete structures in China GB [8] , calculated spiral steel axial bearing capacity, thenssuperimposed on the calculated value o In the past several decades, horizontal earthquake excitation has been studied extensively and considered in the design process whereas the vertical component of earthquake excitation has generally In the past several decades, horizontal earthquake excitation has been studied extensively and considered in the design process whereas the vertical component of earthquake excitation has generally been neglected in design, and rarely studied from the hazard viewpoint. However, recent studies, supported with increasing numbers of near-field records, indicate that the ratio of peak vertical-to-horizontal ground acceleration can exceed the usually adopted two thirds. Furthermore, field observations from recent earthquakes have confirmed the possible destructive effect of vertical ground motion. Therefore, the significance of vertical ground motion has gradually become of concern in the structural earthquake engineering community. Vertical motion has also been attracting increasing interest from the engineering seismology community. This report presents an investigation of the effect of vertical ground motion on RC structures studied through a combined analytical-experimental research approach. The building was located approximately km from the epicenter. It has 12 spans in E-W direction and 3 spans in N-S direction. It consists of two st It consists of two stories and is separated into two modules at the center which allows independent vibration of each module. During the earthquake, many columns of the building were heavily damaged by shear-flexure-axial interaction. Masonry infill walls shortened the effective length of columns, which resulted in brittle shear failures. Part of the structure was overloaded with partition walls on second floor which might have led to the crushing of columns below. The analytical model of the building is based on the field measurements. Actual size of structural elements, non-structural elements, and exposed reinforcements were measured during field investigation. Unexposed rebars and material properties are determined considering construction practice. Ground motion recorded at a station located at 0. To investigate the effect of infill walls on shear force demand, two analyses are conducted; with and without infill walls. The analysis results confirmed that shear force demand on columns with infill walls is significantly higher than those without infill walls. In addition the seismic demand with infill wall is larger than the shear force capacity estimated from design equation. It is anticipated that infill walls in the first floor, overload in the second floor, and inadequate stirrups of the columns resulted in the failure of columns. The reinforcements of beams were notsobtained from the field as none of them were exposed. Thus the reinforcements are determined from designing of the T-beam under gravity load. It can be easily no This study summarizes state-of-the-art knowledge in the seismic response of vertically irregular building frames. Criteria defining vertical irregularity as per the current building codes have been discussed. A review of studies on the seismic behavior of vertically irregular structures along with t A review of studies on the seismic behavior of vertically irregular structures along with their findings has been presented. It is observed that building codes provide criteria to classify the vertically irregular structures and suggest dynamic analysis to arrive at design lateral forces. Most of the studies agree on the increase in drift demand in the tower portion of set-back structures and on the increase in seismic demand for buildings with discontinuous distributions in mass, stiffness, and strength. The largest seismic demand is found for the combined-stiffness-and-strength irregularity.

Chapter 3 : /R Building Code Requirements for Structural Concrete and Commentary

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INTRODUCTION /R-1 ACI Building Code and Commentary PREFACE The code portion of this document covers the design and construction of structural concrete used in buildings and.