

EXPANSION JOINTS IN BUILDINGS

Technical Report No. 65

Prepared by the Standing Committee on Structural Engineering of the
Federal Construction Council
Building Research Advisory Board
Division of Engineering
National Research Council

NATIONAL ACADEMY OF SCIENCES
Washington, D.C. 1974

Expansion Joints In Buildings Technical Report No 65

Federal Construction Council



Expansion Joints In Buildings Technical Report No 65:

Expansion Joints in Buildings National Research Council, Division on Engineering and Physical Sciences, Federal Facilities Council, Building Research Advisory Board, Standing Committee on Structural Engineering of the Federal Construction Council, 1974-02-01 Many factors affect the amount of temperature induced movement that occurs in a building and the extent to which this movement can occur before serious damage develops or extensive maintenance is required In some cases joints are being omitted where they are needed creating a risk of structural failures or causing unnecessary operations and maintenance costs In other cases expansion joints are being used where they are not required increasing the initial cost of construction and creating space utilization problems As of 1974 there were no nationally acceptable procedures for precise determination of the size and the location of expansion joints in buildings Most designers and federal construction agencies individually adopted and developed guidelines based on experience and rough calculations leading to significant differences in the various guidelines used for locating and sizing expansion joints In response to this complex problem Expansion Joints in Buildings Technical Report No 65 provides federal agencies with practical procedures for evaluating the need for through building expansion joints in structural framing systems The report offers guidelines and criteria to standardize the practice of expansion joints in buildings and decrease problems associated with the misuse of expansion joints Expansions Joints in Buildings Technical Report No 65 also makes notable recommendations concerning expansion isolation joints and the manner in which they permit separate segments of the structural frame to expand and to contract in response to temperature fluctuations without adversely affecting the buildings structural integrity or serviceability

Expansion joints in buildings ,1974 Geological and Geotechnical Engineering in the New Millennium

National Research Council, Division on Earth and Life Studies, Board on Earth Sciences and Resources, Committee on Geological and Geotechnical Engineering, Committee on Geological and Geotechnical Engineering in the New Millennium: Opportunities for Research and Technological Innovation, 2006-03-03 The field of geoengineering is at a crossroads where the path to high tech solutions meets the path to expanding applications of geotechnology In this report the term geoengineering includes all types of engineering that deal with Earth materials such as geotechnical engineering geological engineering hydrological engineering and Earth related parts of petroleum engineering and mining engineering The rapid expansion of nanotechnology biotechnology and information technology begs the question of how these new approaches might come to play in developing better solutions for geotechnological problems This report presents a vision for the future of geotechnology aimed at National Science Foundation NSF program managers the geological and geotechnical engineering community as a whole and other interested parties including Congress federal and state agencies industry academia and other stakeholders in geoengineering research Some of the ideas may be close to reality whereas others may turn out to be elusive but they all present possibilities to strive for and potential goals for the future Geoengineers are poised to expand

their roles and lead in finding solutions for modern Earth systems problems such as global change emissions free energy supply global water supply and urban systems

Advances in Structural Engineering Vasant Matsagar, 2014-12-12 The book presents research papers presented by academicians researchers and practicing structural engineers from India and abroad in the recently held Structural Engineering Convention SEC 2014 at Indian Institute of Technology Delhi during 22-24 December 2014 The book is divided into three volumes and encompasses multidisciplinary areas within structural engineering such as earthquake engineering and structural dynamics structural mechanics finite element methods structural vibration control advanced cementitious and composite materials bridge engineering and soil structure interaction *Advances in Structural Engineering* is a useful reference material for structural engineering fraternity including undergraduate and postgraduate students academicians researchers and practicing engineers

Rigidly Framed Earth Retaining Structures Walid Aboumoussa, Magued Iskander, 2014-06-23 Structures placed on hillsides often present a number of challenges and a limited number of economical choices for site design An option sometimes employed is to use the building frame as a retaining element comprising a Rigidly Framed Earth Retaining Structure (RFERS) The relationship between temperature and earth pressure acting on RFERS is explored in this monograph through a 4-5 year monitoring program of a heavily instrumented in service structure The data indicated that the coefficient of earth pressure behind the monitored RFERS had a strong linear correlation with temperature The study also revealed that thermal cycles rather than lateral earth pressure were the cause of failure in many structural elements The book demonstrates that depending on the relative stiffness of the retained soil mass and that of the structural frame the developed lateral earth pressure during thermal expansion can reach magnitudes several times larger than those determined using classical earth pressure theories Additionally a nearly perpetual lateral displacement away from the retained soil mass may occur at the free end of the RFERS leading to unacceptable serviceability problems These results suggest that reinforced concrete structures designed for the flexural stresses imposed by the backfill soil will be inadequately reinforced to resist stresses produced during the expansion cycles Parametric studies of single and multi story RFERS with varying geometries and properties are also presented to investigate the effects of structural stiffness on the displacement of RFERS and the lateral earth pressure developed in the soil mass These studies can aid the reader in selecting appropriate values of lateral earth pressure for the design of RFERS Finally simplified closed form equations that can be used to predict the lateral drift of RFERS are presented

KEY WORDS Earth Pressure Soil Structure Interaction Mechanics Failure Distress Temperature Thermal Effects Concrete Coefficient of Thermal Expansion Segmental Bridges Jointless Bridges Integral Bridges Geotechnical Instrumentation Finite Element Modeling FEM Numerical Modeling

Expansion and Contraction Joints in Reinforced Concrete Buildings David C. Gray, David Darwin, 1984

Concrete and Masonry Movements Jeffrey Brooks, 2014-08-23 Widely used in the construction of bridges dams and pavements concrete and masonry are two of the world's most utilized construction

materials However many engineers lack a proper understanding of the methods for predicting and mitigating their movements within a structure Concrete and Masonry Movements provides practical methods for predicting and preventing movement in concrete and masonry saving time and money in retrofitting and repair cost With this book in hand engineers will discover new prediction models for masonry such as irreversible moisture expansion of clay bricks elasticity creep and shrinkage In addition the book provides up to date information on the codes of practice Provides mathematical modelling tools for predicting movement in masonry Up to date knowledge of codes of practice methods Clearly explains the factors influencing all types of concrete and masonry movement Fully worked out examples and set problems are included at the end of each chapter

Housing and Planning References ,1975 **Recent Developments in Sustainable Infrastructure (ICRDSI-2020)—Structure and Construction Management** B. B. Das,Christy P. Gomez,Benu. G. Mohapatra,2022-04-25

This book includes selected papers from the International Conference on Recent Developments in Sustainable Infrastructure ICRDSI 2020 and consists of themes pertaining to structural engineering and construction technology and management

Parking Structures Anthony P. Chrest,Mary S. Smith,Sam Bhuyan,2012-12-06 Drawing on the combined expertise of three of the world s leading parking structure experts this updated edition provides the only single source guide to planning designing and maintaining parking structures It provides readers with design solutions including material on how to ensure long term durability design for easy maintenance select the most energy efficient lighting system decide on the number and placement of entrances and exits and avoid the most common construction pitfalls Reflecting recent advances in technological innovations this volume features significantly revised mterial and contains five new chapters on the Americans with Disabilities Act lighting graphics seismic design and designing for maintenance The Second Edition of Parking Structures offers architects engineers parking facility owners and contractors a unique and comprehensive guide to designing safe and effective parking structures In addition institutions providing education courses for professional registration in related fields will benefit from this timely authoritative account

Manual of Steel Construction: Connections American Institute of Steel Construction,1992 Includes bibliographical references and index **ACI Manual of Concrete Practice** American Concrete Institute,2004 *Structural Design Criteria for Buildings* ,1992 *Technical Report* Federal Construction Council,1971 *PCI Design Handbook* Prestressed Concrete Institute,1985 **Journal of the American Concrete Institute** American Concrete Institute,1985 Each number includes Synopsis of recent articles

Designing with Steel Joists, Joist Girders, Steel Deck James M. Fisher,1991 American Book Publishing Record Cumulative, 1950-1977 R.R. Bowker Company. Department of Bibliography,1978 *Developments in Tall Buildings*, 1983 Lynn S. Beedle,Council on Tall Buildings and Urban Habitat,1983 **PCI Design Handbook** ,1999 Accompanying CD ROM contains files that compliment the text

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