

(PREVIEW)
HANDBOOK ON
FUNCTIONAL REQUIREMENTS
OF BUILDINGS
(OTHER THAN INDUSTRIAL BUILDINGS)

FOREWORD

Users of various civil engineering codes have been feeling the need for explanatory handbooks and other compilations based on Indian Standards. The need has been further emphasized in view of the publication of the National Building Code of India in 1970 and its implementation. The Expert Group set up in 1972 by the Department of Science and Technology, Government of India carried out in-depth studies in various areas of civil engineering and construction practices. During the preparation of the Fifth Five-Year Plan in 1975, the Group was assigned the task of producing a Science and Technology Plan for research, development and extension work in the sector of housing and construction technology. One of the items of this plan was the production of design handbooks, explanatory handbooks and design aids based on the National Building Code and various Indian Standards, and other activities in the promotion of the National Building Code. The Expert Group gave high priority to this item and on the recommendation of the Department of Science and Technology, the Planning Commission approved the following two projects which were assigned to the Bureau of Indian Standards:

- a) Development programme on code implementation for building and civil engineering construction, and
- b) Typification for industrial buildings.

A Special Committee for Implementation of Science and Technology Projects (SCIP) consisting of experts connected with different aspects was set up in 1974 to advise the ISI Directorate General in identifying the handbooks and for guiding the development of the work. Under the first project, the Committee has so far identified subjects for several explanatory handbooks/compilations covering appropriate Indian Standards/Codes/ Specifications which include the following:

Design Aids for Reinforced Concrete to IS : 456-1978 (SP: 16-1980)
Explanatory Handbook on Masonry Code (SP : 20-1981)
Explanatory Handbook on Codes of Earthquake Engineering (IS: 1893-1975 and IS : 4326-1976) (SP : 22-1982)
Handbook on Concrete Mixes (SP : 23-1982)
Explanatory Handbook on Indian Standard Code of Practice for Plain and Reinforced Concrete (IS : 456-1978) (SP : 24-1983)
Handbook on Causes and Prevention of Cracks in Building (SP : 25-1984)
Summaries of Indian Standards for Building Materials (SP : 21-1983)
Handbook on Concrete Reinforcement and Detailing (SP : 34-1987)
Handbook on Water Supply and Drainage with Special Emphasis on Plumbing (SP : 35-1987)
Functional Requirements of Industrial Buildings
Handbook on Timber Engineering (SP : 33-1986)

Foundation of Buildings
Steel Code (IS : 800)
Building Construction Practices
Bulk Storage Structures in Steel
Formwork
Fire Safety
Construction Safety Practices
Tall Buildings
Inspection of Different Items of Building Work
Loading Code
Prefabrication

One of the handbooks identified is on Functional Requirements of Buildings (other than Industrial Buildings). This handbook provides detailed information on climatology, heat insulation, ventilation and lighting in non-industrial buildings which would be helpful in the planning and functional design of buildings as applicable to Indian conditions based on Indian Standards and other relevant literature on the subject. These aspects have been dealt in separate parts as indicated below:

- i) Part 1 deals with basic climatic elements, namely, air temperature, solar radiation, humidity, rainfall and wind. The zoning of several regions of the country from climatic considerations is brought out.
- ii) Part 2 deals with heat insulation of buildings, such as dwelling, hospitals, schools and office buildings both for non-air-conditioned and air-conditioned buildings.
- iii) Part 3 gives detailed information on the requirements of ventilation and design guidelines for achieving desired ventilation rates in buildings. The basic principle of ventilation which act as useful tool for the designer to evolve ventilation design for numerous typical cases is also covered. In addition, design factors governing pattern and air flow in-doors are also covered.
- iv) Part 4 deals with design methods for provisions of daylighting, artificial lighting and supplementary artificial lighting which would depend upon the type of buildings and the visual task being performed by the occupants. Design curves provided enable to determine the area of window opening required for a given daylight factor. To simplify the design calculations, the sky component protractors based on the tables of sky components and nomograms for internal reflected components have been provided. Use of these design aids is illustrated with worked examples. Artificial lighting design has been covered through lumen method and point-by-point method.

Energy conservation aspects have also been covered

This Handbook, it is hoped, would provide useful guidance to architects, engineers and other agencies dealing with lighting, ventilation, air-conditioning and illuminating engineering aspects of non-industrial buildings.

This Handbook is based on the draft prepared by the Central Building Research Institute (CBRI), Roorkee. The draft handbook was circulated for review to Shri B. J. Ramrakhiani, New Delhi; Peico Electronics & Electricals Ltd, Bombay; General Electric Company of India Ltd, Calcutta; Central Public Works Department, New Delhi; Bharat Electrical Industries Ltd, Calcutta; Crompton Greaves Ltd, Bombay; Housing & Urban Development Corporation Ltd, New Delhi; Dr. V. Narasimhan, Madras; Headquarters Chief Engineer, Rajasthan and Gujarat Zone, Jaipur; National Physical Laboratory, New Delhi; Central Mechanical Engineering Research Institute, Durgapur; Directorate General of Meteorological Department, New Delhi; Danfoss (India)Ltd, New Delhi; Headquarters, Southern Command, Engineers Branch, Pune and S.F. India Ltd, Bombay; and the views received were taken into consideration while finalizing the Handbook.