

Researches
in
PLANNING AND ARCHITECTURE
(Sustainable Smart City, Green Library and Military Architecture)
A Peer Reviewed volume
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to
Maa Harsidhi- Mahakaleshwar
Shipra - Avantika

Know about

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Prof. (Dr.) N.V. Ramana Rao is an eminent and well-known Academician, Administrator, Professor & Consultant-Expert in the field of Civil and Structural Engineering. Professor Ramana Rao has spent a long span of time, more than 33 years in Research, Teaching, Consultancy-Advisory work related to Civil Engineering Design, RCC Structures, and High-Rise Buildings Projects for various organizations, establishments, State Government, and Semi-Government sectors.

He has assumed charge as Director (In-Charge) of National Institute of Technology Andhra Pradesh on 4th November, 2024. He has edited 5 books and published 195 research papers in International/National Journals and International/National Conferences, and has successfully guided 15 doctoral theses. Research work continues under him with many Ph.D. scholars in the Civil Engineering discipline. Prof. Rao has achieved many awards and fellowships like the Eminent Engineer Award (2018) given by the Association for Construction Industry Contribution Civil Engineers (India) –ACCE (I), Outstanding Award (2012 & 1989) and Best Design Award (2004) by the Indian Concrete Institute (ICI), Arthur Cotton Prize (2012, 2015), and Bharat Ratna M. Visvesvaraya Prize (2020) by the Institution of Engineers (IEI). Among his academic research awards is the Commonwealth Fellowship (1981 and 1998). Prof. Rao completed his doctoral and post-doctoral research at the University of Wales, Swansea, UK.

He has organized 12 workshops, served as Convenor for EAMCET (2010-16), delivered 15 invited lectures, and conducted 14 various courses. His field of interests includes Design of RCC Structures, High Rise Buildings, and Construction Waste Material Recycling. He holds special expert membership in the Planning Board & Building Works Committee (BWC) at IIIT Tiruchirappalli, serves as Structural Engineer for Yadadri Temple in Telangana, designed bridges over the Musi River in Andhra Pradesh, and conducted proof checking of Defense Buildings with focus on stability, quality & safety in construction of many major infrastructures of national importance.

He has held many chairs in research projects, including Director of Bureau of Industrial Consultancy Research and Development (BICARD) at JNTU (3 years), Principal at JNTU, Director at NIT Warangal, Andhra Pradesh (2017-2023), and Director at School of Planning and Architecture, Vijayawada (1 year). He has visited foreign countries including the UK, USA, Germany, Australia, Spain, Portugal, and South-East Asian countries (more than 25 countries).

Prof. Rao is a life member, Executive Fellow, Convenor, and Chairman of various professional bodies and organizations including ICI, JNTU, FTAS, and serves as an external expert on scientist selection committees for DRDO (Government of India), Telangana State Police Department, ISRO, DPC, AICTE, and others.

Prof. Ramana Rao is always motivating incumbent scholars, providing guidance for new domains of consultancy and entrepreneurship development, and continues participating in academic activities.



FOREWORD

DIRECTOR

**National Institute of Technology,
RAIPUR (C.G.)**



Planning and Project schemes for Infrastructures being an integral part of many kinds of Building Constructions, needed for various purposes eg. Township, Urban settlements, commercial & Strategic important units. The prospects in Civil Engineering works likely to be expanded in next coming decades including projects of Smart cities Planning and Development, Construction of Green Buildings, Disaster Management with Earthquake proof - Seismic resistant Buildings in Hilly Terrain of Himalayas. Since 4th Century BC the urban centres and fortified cities were common in Ancient India, eg. Mathura (Bank of Yamuna river), Magadha (Bank of Ganga River), Ujjain (Bank of Shipra River) were prestigious and well known Hindu Settlements/Towns. In India, the Technology and Skills deeply rooted within its Traditional knowledge (TK) and it raises sustainable development with unique perspectives and carrying the Traditional Knowledge System (TKS). In this book, the efforts have been made to establish the integration of Traditional Knowledge (TK) with the Architecture. Planning of Modern Smart City, Green Library Buildings and sustainable development scheme beneficial in present High Level Seismic Zones of Himalayan Hilly Terrain of India. Also, the Author of Book has included recent Scientific & Technological approaches of Remote Sensing data products, satellite Imagery interpretations in form of Maps and chapters have been peer reviewed by subject experts, it ranks the Academic value of matters.

I hope, that the subject topics, methodologies and illustrations of the matters will be useful to Researchers, Academicians, professionals and students of the concerned discipline.

1st Edition



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N.V. Ramana Rao
Prof. (Dr.) N.V. RAMANA RAO
Director, NIT, Raipur, C.G.

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PREFACE

In the present scenario of Modern Ages, the Traditional Planning, Architecture, Design, Construction Materials, works, natural resource utilization, site selection have been changed and modified according to the time span and regional environmental terrain conditions. The trends of sustainable use of Building materials tremendously increased. The optimum benefits can be achieved only through modifications, application of New Concepts of Designing, Planning and Eco-friendly consumption of Raw Materials in construction of buildings / Infrastructures. Ancient Indian Forts are Mega Infrastructures, its constructions practiced since Janapada Kingdoms. It became one of the richest Architectural Heritage Structure of Indian Culture, Society and historical states. The Indian Hindu Forts are legacy of the Traditional know-how Knowledges about Building Materials. Granite, Sand stones and Other intact Hard rocks used in Fortification. The Forts are important typologies in Built Heritages of India. The efforts have been made to present a comprehensive and cogent descriptions related to the Planning, Design, Architecture and Infrastructures built in Structures Sustainability. In seven chapters of Book, the main themes comprises, Planning and Architecture of Smart City Concepts, Eco-friendly Library, Learning Centres, its norms and standards, specifications, Indian knowledge of Huge Military Base Structures eg. Forts on Hill Top and Seismic resistant buildings in Himalayan Terrain have been included and elaborated with critical interpretations.

I am thankful to the authors, Whose ideas / themes / works presented as a chapter in this Research book and hope that these chapters of this book is likely to be helpful to the readers and scholars of Planning and Architecture studies.

1st Edition



Dr. (Ar.) D. SANYAL
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Ar. (Dr.) Debashis Sanyal

Architect (Dr.) Debashis Sanyal, M.Arch., PhD. has more than 38 years research and teaching experience in Architecture discipline in National Institute of Technology Raipur. He is individual Member of International Council for Research and Innovation in Building and Construction (CIB), Netherlands and Council on Tall Buildings and Urban Habitat, USA. His active research areas of interest are Historical forts, Conservation and preservation of Ancient Indian monuments, Self Efficient Housing, Eco-cities, Super tall Intelligent buildings, industrialized mass housing, Indoor Air quality. He was awarded justice Mahapatra Award for research by Rotary Club of Raipur Central in 1995, A3F best teacher award from A3foundation Chandigarh and award for valuable contribution in Engg. & Technology by The Institution of Engineers (India) Chhattisgarh state center in 2019. Till date he has published 36 research papers in international journals and presented 66 research papers in National/international conferences by visiting 35 countries.

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Urban Planning, Disaster Management, Indian, ancient Township Architect, Dr. Nirmita Mehrotra, Head, Deptt. of Architecture & Planning, Gautam Buddha University, Greater Noida has varied professional and Teaching experiences in Architecture Discipline in India and Abroad. She is continuously published about three dozen Research papers and Articles in International Journals and participating the Academic conferences of National and International Levels viz, SPA Delhi, Horizon Europe, India, China



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