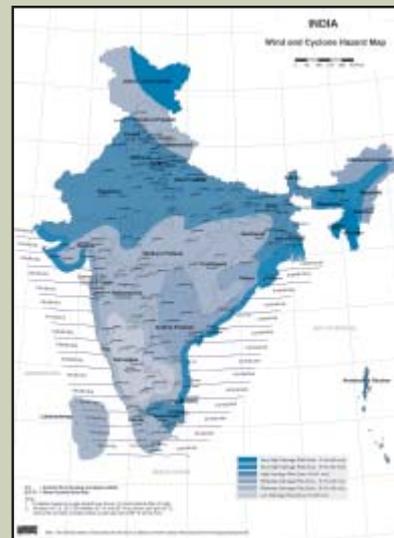




# Guidelines

## Improving Wind/Cyclone Resistance of Housing

2010



Building Materials & Technology Promotion Council  
Ministry of Housing & Urban Poverty Alleviation  
Government of India, New Delhi

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## FOREWORD

A long coast line of about 7500 km of flat terrain, shallow continental shelf and high population density makes the coastal areas of India extremely vulnerable to high velocity winds, moderate to high storm surges riding over astronomical tides and very heavy rains. The vulnerability of these areas to high sea waves became evident during the 2004 Indian Ocean Tsunami which caused very heavy loss of lives in the state of Tamil Nadu and the Andaman & Nicobar Islands. In view of increased vulnerabilities of the coasted areas, BMTPC took the decision of revising and updating its earlier publication on the subject of cyclone safety of housing.

I have now great pleasure and pride in bringing out the BMTPC's revised publication entitled Guidelines for Improving Wind/Cyclone Resistance of Housing: 2010, for the benefit of all the stakeholders involved in Cyclone risk management and mitigation. The publication is the updated version of our earlier version with the same title. Since then there has been constant updation of our knowledge in the area through several failures all over the world. At the same time, codes are also being modified. Further, a lot of improvements have taken place as regards the strategy of Indian subcontinent is concerned towards combating cyclone and tsunami risk. Subsequent to the super cyclone in Orissa in 1999, our concern about safety of people and the habitations in the coastal areas has increased manifold. The 2004 Indian Ocean tsunami added to this concern. Therefore, it was felt obligatory to bring out newer version of our earlier published guidelines with an added chapter on Cyclone cum Tsunami shelters design. This document would serve as an explanatory handbook on the various clauses of Indian Standards on Wind resistant design of new buildings or improving resistance of existing building stock. Also, through these guidelines, we wish to pass on knowledge and expertise to our planners, engineers and architects and above all to the common people of India to whom we owe, what have been learnt through all these recurrent natural hazards. It has been endeavor of BMTPC to educate the masses and disseminate the knowledge in comprehensible lingo through its publication.

I place on record my deep appreciation for Dr. A. S. Arya, Prof. Emeritus, IIT, Roorkee to take up the challenge of preparing the updated version of guidelines.

*Let us build India as Resilient Society to various natural hazards.*

September 29, 2010

Dr. Shailesh Kr. Agrawal  
Executive Director, BMTPC

## PREFACE

**F**or determining the wind forces on buildings and structures, Indian Standard 875-1987 (3) lays down the wind velocity zoning map of India, method of computing wind pressures on various surfaces, and various design factors to be taken into consideration. The cyclone affected coastal areas are also fully covered so far as wind effects are concerned. These principles and data could be used by engineers using usual methods of structural analysis and design of buildings and structures.

But there are numerous details found necessary to be adopted in construction which are not yet covered in any standard. Then there are various types of the so called non-engineered buildings particularly housing, which are traditionally built by people in cyclone prone as well as other high wind velocity areas in which severe damage occurs under wind hazard occurrences. The Expert Group constituted in 1994 by the then Ministry of Urban Development had also examined the related standards, codes and other national and international publications with a view to prepare suitable guidelines covering the general principles for safety of housing from wind hazard and detailing for minimising damage in engineered as well as non-engineered buildings. Ideas, as available, in national as well as international publications were adapted to the Indian situations and covered in the guidelines prepared by Dr.N.M.Bhandari and Dr.A.S.Arya, Professors in University of Roorkee and published by BMTPC in 1999-2000.

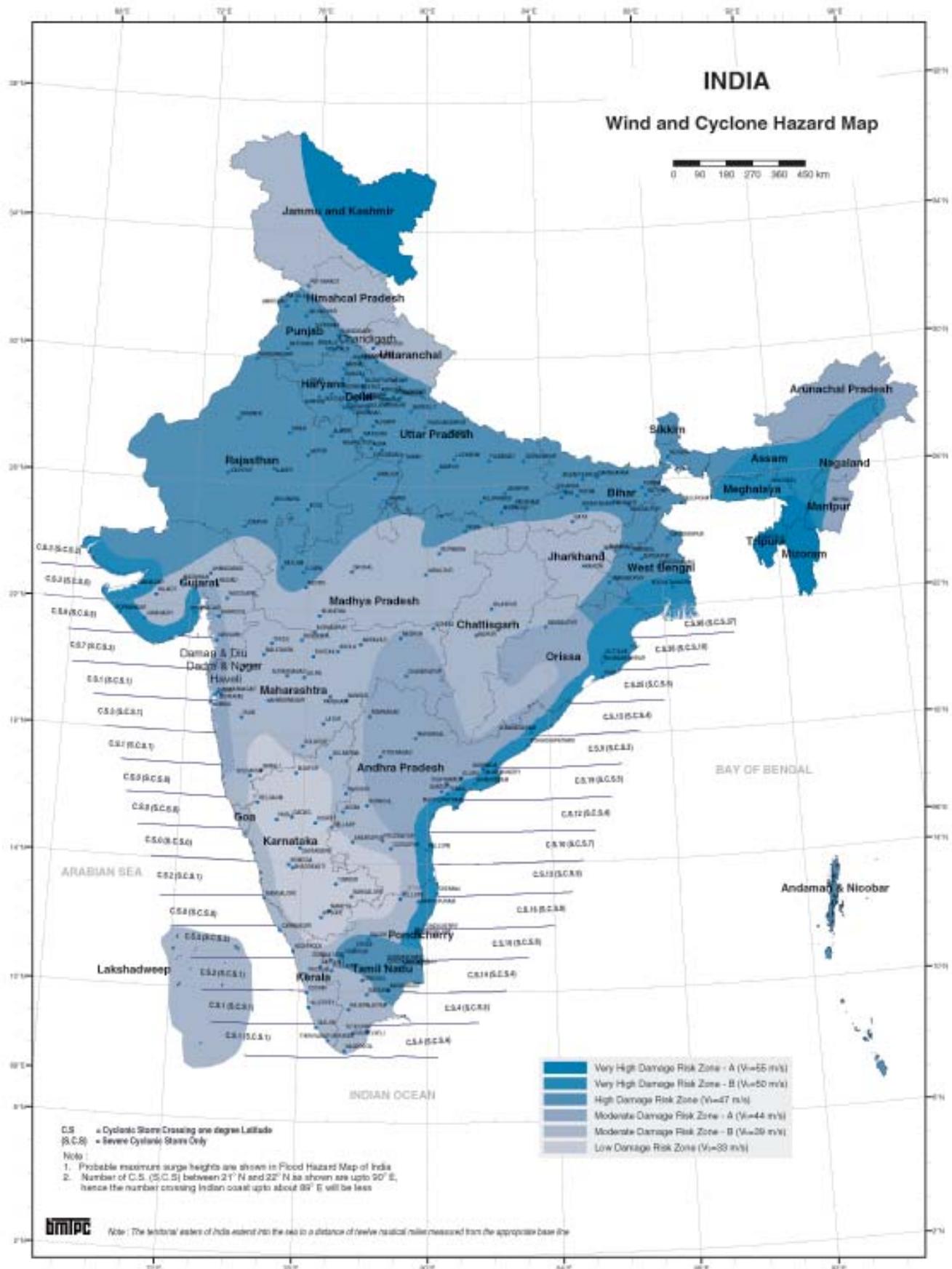
In this revised edition, two new chapters have been added besides editorial improvement in the document. The first chapter now gives basic information for understanding characteristics of cyclones and their classification according to Indian and U.S. scales. The number of cyclones and 'severe' cyclones occurred in each latitude of Indian coasts as well as storm surge heights observed at several points at the coasts are shown in maps for ready reference. The last chapter now deals with the design considerations for construction of cyclone shelters, as drafted by Dr.A.S.Arya as National Seismic Advisor under GOI-UNDP DBM Programme.

August 2010

Anand S.Arya  
Professor Emeritus  
IIT Roorkee

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BMTPC : Vulnerability Atlas of India – 2nd Edition (2006); Peer Group, MoH&UPA; Map is based on digitised data of SOI, GOI; Basic Wind Speed Map, IS 875(3) - 1987-2005, IMD, GOI

**Wind & Cyclone Hazard Map of India**