

# Across wind loads and response of tall buildings



A thesis submitted in partial fulfillment  
for the Award of Degree  
*Doctor of Philosophy*

by  
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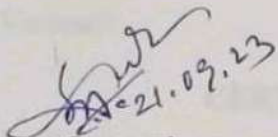
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“I would like to dedicate this thesis to my  
parents, who encouraged me to strive for  
excellence through perseverance and  
commitment”

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## List of Symbols

$a$	Exponent of mean velocity profile
$f$	Natural frequency of the structure
$M_a$	Base bending moment
$F_z$	Design peak ESWL
$\bar{V}_{z,d}$	Design hourly mean wind speed
$G$	Gust factor
$\beta$	Damping coefficient
$\beta$	Mode shape index
$U^*$	Reduced wind velocity
$H$	Height of the building
$B$	Width of the building
$D$	Depth of the building
$\zeta_s$	Structural damping ratio
$\zeta_a$	Aerodynamic damping ratio
$U_H$	Mean velocity of approaching wind at the top of the building
$I_H$	Turbulence intensity
$g_R$	Peak factor for resonant response
$g_B$	Background peak factor
$V_b$	Basic wind speed
$E$	Modulus of elasticity
$\nu$	Poisson's ratio

## Abbreviations

3D	Three dimensional
AIJ	Architectural Institute of Japan
AS	Australian Standards
ASCE	American Society of Civil Engineer
CFD	Computational Fluid Dynamics
CTBUH	Council of Tall Buildings and Urban Habitat
ESWL	Equivalent Static Wind Load
GL	Gust Loading Factor
HAR	Height Aspect Ratio
ICS	Integrated Control System
IS	Indian Standards
ISO	International Organization for Standardization
KBC	Korean Building Code
MWFRS	Main Wind Force Resisting Systems
NBC	National Building Code
NBCC	National Building Code of Canada
NZS	New Zealand Standards
PAR	Plan Aspect Ratio
RMS	Root Mean Square
TLD	Tuned Liquid Damper
TMD	Tuned Mass Dampers