شبكة المعلومات الجامعية

التوثيق الإلكتروني والميكروفيلم

بسم الله الرحمن الرحيم

HANAA ALY

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جامعة عين شمس

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قسم

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علي هذه الأقراص المدمجة قد أعدت دون أية تغيرات

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تحفظ هذه الأقراص المدمجة بعيدا عن الغبار

HANAA ALY

RELIABILITY ANALYSIS OF REINFORCED CONCRETE FLAT SLABS

By

Mohammed Ahmed Abdel-Razek Ali

A thesis Submitted to the
Faculty of Engineering at Cairo University
In Partial Fulfillment of the
Requirements for the Degree of
Master of Science
In
Structural Engineering

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
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B. Sc. Civil Engineering 2010 (Hon.)

Under the Supervision of

Dr. Walid Abdel-Latif Attia
Professor
Structural Engineering department
Faculty of Engineering
Cairo University

Dr. Metwally Abd El-Aziz
Professor
Structural Engineering department
Faculty of Engineering
Cairo University

Dr. Morcos Farid Saman
Assistant Professor
Structural Engineering department
Faculty of Engineering
Higher Technological Institute 10th of Ramadan

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Approved by the
Examining Committee

Dr. Walid Abdel-Latif Attia
Professor-Dept. of Structural Analysis, (Thesis Main Advisor)
Faculty of Engineering-Cairo University

Dr. Metwally Abd El-Aziz
Professor-Dept. of Structural Analysis, (Advisor)
Faculty of Engineering-Cairo University

Dr. Sherif Ahmed Mourad
Professor-Dept. of Structural Analysis, (Internal Examiner)
Faculty of Engineering-Cairo University

Dr. Alaa Gmal Sherif
Professor-Dept. of Structural Analysis, (External Examiner)
Faculty of Engineering-Helwan University

FACULTY OF ENGINEERING, CAIRO UNIVERSITY
GIZA, EGYPT
Year 2020

Acknowledgment

I thank God who is unique for the blessings. I praise God for helping me to complete this thesis. I ask for his pardon and forgiveness. Praise be to God for facilitating the reasons for me from everything and the people in my life.

I thank my mother and pray to God to preserve and take care of her. I thank my family for standing by me and providing psychological and moral support, and I hope they will forgive me, as I have burdened them with my burden.

I thank God for the supervising doctors, I thank Prof. Dr. Metwally Abd El-Aziz and I ask God for him the mercy and forgiveness, as he provided me with the necessary support until he died.

I also thank Prof Dr. Walid Abdel-Latif Attia, for his approval to supervise after the death of Prof. Dr. Metwally Abd El-Aziz, under difficult circumstances and pressured time. I also always thank him for providing me with sufficient support, wishing him continued health and wellness.

I thank Dr. Morcos Farid Saman, he Lend me a helping hand in all stages starting from choosing the topic of the thesis and passing through supervising it and providing the necessary scientific material to contribute to the completion of the thesis. I thank him for the psychological and moral support and patience for me to learn, wishing him continued health and peace of mind.

I thank God for the presence of my friends in my life, as they supported me emotionally and morally despite the busy work and life's concerns.

I would like to thank my big brother Eng. Mohamed Darwish for providing me with the necessary materials to learn the programming language and for educating me and broadening my horizon in its application and tracking it to my development throughout the thesis and presenting his suggestions.

I thank my brother Eng. Mohamed Fathy Ali, who was keen on explaining to me how to insert references and tables automatically.

I thank my professors and colleagues for their continued check on my news and for following up on my progress in the thesis. I also thank my professors who I have learned from them.

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Nomenclature

β	Reliability index
Φ	Cumulative standard normal distribution function
Q_x & Q_y	The internal shear force per unit length along x and y direction respectively
M_x & M_y	The bending moment in along x and y direction respectively
M_{xy}&M_{yx}	The twisting moment
ω	Plane displacement
θ_x	The rotation angles about X-axis
θ_y	The rotation angles about Y-axis
$\{\varepsilon\}$	The total strain
$\{\varepsilon\}^e$	The elastic strain
$\{\varepsilon\}^p$	The plastic strain
σ_{ij}	The stress in j direction on the normal surface to i direction
E	The young's modulus
υ	The passion ratio
D	The bending stiffness
∇	The Laplacian operator
A_s	The area of steel for unit width of the slab
σ_y	The yield stress of steel,
j d	The arm of the internal forces
α	The yield line inclination angle with the reinforcement in X direction
m_1	The reinforcement in X direction
m_2	The reinforcement in Y direction
m	The reinforcement in X &Y direction in isotropic slab
m_b	The ultimate moment per unit width

m_t	The twisting moment per unit width
W	The external work
E_d	The dissipated energy
q	The lateral load on slab
l_y	The yield line length
θ	The rotational angle of each rigid part about the yield line
Z	The safety margin
R	The resistance variable
S	The load variable
P_f	The probability of failure
$f_{r,s}$ (r,s)	The joint probability function of both load and resistance
F_R(r)	The probability density function for resistance
F_S (s)	The probability density function for load
f_z (z)	The probability density of the safety margin
Φ	The standard normal distribution function
μ_z	The mean of the random variable Z
σ_z	The standard deviation of the random variable Z
m	The number of failure modes
c(m)	The vector of reliability indices
x(m)	Vector of normal standard correlated normal variables
R(m x m)	The correlation matrix
$\varphi(u)$	The standard density function
β_i	The reliability index of component
β_j	The reliability index of component j
z	The correlated standard normal variable.
ρ_0	The demarcating correlation
ρ_{z_i,z_j}	The mutual correlation between each two modes of safety margins z_i, z_j
σ_{z_i} and σ_{z_j}	The standard deviations of safety margins z_i, z_j,respectively