الآية

قال تعالى:

(قَالَ لَا تَخَافَا ۖ إِنَّنِي مَعَكُمَا أَسْمَعُ وَأَرَىٰ)

سورة طه الآية (٤٦)

ACKNOWLEDGEMENTS

First I would like to thank the God, without the God, I could not have the Lowest level of knowledge much less completed this research. I am heartily thankful to my supervisor; **Dr. ABUSAMRA AWAD ATTAELMANAN**, whose encouragement, guidance and support from the initial to the final level enabled me to develop an understanding of the subject.

Also, my heartfelt thanks to my Mom and Dad, my family and all my friends who have contributed the lions share in the success of my life yet. Lastly, I offer my regards and blessings to all of those who supported me in any respect during the completion of the research.

AHMED MAHGOUB EISSA GIBRIL

2017

Abstract

In this research, three configurations of water tanks were taken to study structure behavior by using structure analysis programs for different loads cases (dead loads, lives load, wind loads and their combinations).

The analysis results were drawing in graphical presentation in order to study structural behavior of three configurations; it was taken the variation of axial force under effect of wind, variation of axial load produce from configurations self weight and displacement produce from wind for the three configurations.

The allowable stress method and ultimate state design are used for element design of configurations. From comparing result between the three configurations, the third configuration is the best whence of structure behavior.

المستخلص

في هذا البحث ، ثلاثة نماذج من خزانات المياه، أخذت لدراسة السلوك الإنشائي بإستخدام عدة برامج للتحليل الإنشائي لحالات مختلفة من الأحمال (أحمال ميتة، أحمال حية، أحمال الرياح وتراكيب الأحمال).

نتائج التحليل وضحت في رسومات تخطيطية لكي يدرس السلوك الإنشائي للنماذج الثلاثة، أخذ إختلاف القوى المحورية تحت تأثير الرياح مع إرتفاع الخزانات وإختلاف القوى المحورية الناتجة من أوزان النماذج وكذلك الإنحراف الناتج من الرياح للنماذج الثلاثة. تم إستخدام طريقة المقاومة القصوى والإجهاد المسموح به في تصميم عناصر النماذج. من إختلاف النتائج بين النماذج الثلاثة وجد أن النموذج الثالث هو الأفضل من حيث السلوك الإنشائي.

List of contents

List of tables

List of figures

List of symbols

P_u	Ultimate load
P_n	Nominal load
P_{nmax}	Maximum nominal load
P_w	Working load
M_w	Working moment
M_u	Ultimate moment
d	Effective depth
d_b	Diameter of bar
d_t	Diameter of ties bar
b	Column width
h	Height
B	Width
L	Length
D	Diameter of circular section
e	Eccentricity
$f_{c'}$	Concrete compression strength
f_y	Yield stress
f_c	Stress in concrete
f_s	Stress in reinforcement

E_s	Modules of elasticity for steel
E_c	Modules of elasticity for concrete
n	Constant (with appropriate subscripts)
k	Constant (with appropriate subscripts)
j	Constant (with appropriate subscripts)
T_{max}	Maximum tension
z	quantity limiting distribution of flexural reinforcement
c	Coefficient of shrinkage
A_s	Area of steel reinforcement
A_v	Area of shear reinforcement
A_b	Area of reinforcement bar
s_{max}	Minimum spacing control cracking
s	spacing
h_{min}	Minimum thickness resistance deflection
c_p	External pressure coefficient
k_z	Velocity pressure exposure coefficient
k_{zt}	Topographic factor
k_d	Wind directionality factor
q_{all}	Allowable bearing capacity

q_u	Ultimate bearing capacity
V_u	Ultimate shear force
$\emptyset V_c$	Shear force resistance by concrete section
R_u	Resistance factor
R_{urev}	Revised resistance factor
ρ_{min}	Minimum reinforcement ratio
ρ_b	Balance reinforcement ratio
ρ	Reinforcement ratio