Dedication

In Memory of my mother

And

In Love of my Father

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Abstract

This research is concerned with the study of the effect of wind load on tall buildings. In the study the wind load is dealt with since it is more likely to take place in Sudan and affect tall buildings. The importance of carrying out nonlinear p.Δ and p . $\Delta.w.l$ as compered to linear static analysis is studied

A twenty story building is analyzed linearly and nonlinearly for wind loads via the commercial software ETABS v13.The linear results are then presented graphically against results of a previous study of a similar building for the comparison so as to check the accuracy of the model. Also nonlinear analysis using p-.Δ And p-Δ With large displacement methods and linear results are compared with each other. The results wear compared for displacement and shear.

On bases of these recommendations on the analysis type necessary for tall building subjected to wind loads are drawn. The results shown that the use of the p .Δ with large displacement analysis is important it the correct displacement and shear force are to be obtained

مسستخلص

يهتم هذا البحث بدراسة أثر أحمـــال الريـــاح عـــن طريـــق التحليـــل الـــلا خطـــي علـــي المباني العالية.في هذه الدراسة تم التعامـــل مـــع أحمـــال الريـــاح فقـــط لان لهـــا نســـبه احتمال حدوث اكبر في الســـودان مقارنـــة بـــالكوارث الأخـــرى. ويهـــتم هـــذا البحـــث بدراسة اهميـــة إجـــراء التحليـــل الـــلا خطـــي بطريقـــة (P. Δ with large) & (P. Δ) مقارنة بالتحليل الخطي.

تمت دراسة مبني مكون من عشرين طابقآ وتـــم تحليـــل هـــذا المبنـــي بواســـطة برنـــامج التصميم ETABSv13تحت تـــأثير القـــوي الأفقيـــة للريـــاح وتـــم التحليـــل بـــالطريقتين وتمت مقارنة نتائج التحليل الخطي مـــع نتـــائج دراســـة ســـابقة لمبنـــي مماثـــل وذلـــك بغرض إختبار دقة النموذج وتمت مقارنة التحليل الخطـــي مـــع التحليلـــين الـــلا خطيـــين بواسطة) (P. Δ)(P. Δ w large).وعرضـــت هـــذه النتـــائج فـــي شـــكل مخططـــات توضح اثر حمولات الرياح بالنسبة للإزاحة وقوة القص.

وعلي ضوء هذه المقارنة تم وضـــع مقترحـــات عـــن نـــوع التحليـــل المناســـب للمبـــاني العالية المعرضة لأحمال الرياح. وقـــد اظهـــرت النتـــائج ضـــرورة إســـتخدام التحليـــل اللاخطي(P. Δ)للحصول علي الازاحات وقوة القص الصحيحة.

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g stander deviation

G gust factor

gp peak factor

no fundamental natural frequency

r roughness factor

B excitation due to the ground turbulence

R excitation by the turbulence resonant with structure

β damping ratio

F frequency

aD maximum acceleration

Δ maximum wind induced deflection at the top of the building

Vobace shear

P average density of the building

P design pressure

q Velocity pressure

W total load

M mass matrix

U displacement vector

Kz	The velocity pressure exposure coefficient..
Kzt	Topographic factor as input by the user.
Kd	Directionality factor as input by the user.
V	Basic wind speed in miles per hour (mph) as input by the user
I	Importance factor as input by the user.
z	Distance (height) from input bottom story