

ABSTRACT

In this study, it was applied the American Specifications for Structural Steel Buildings standard by taking the effect of the wind loads on designing of steel tall building frames depending on the location and topography of construction place. In order to study the structural behavior of the frames, different types of tall building forms were selected with typical plans and heights. These systems were rigid, shear-wall and tube frames. Each selected type of tall building frame was studied using three different types of bracing system, as well as, unbracing frame system. The bracing types were cross, diagonal and V-shape. The unbraced frames were assumed to be the basic reference for comparative purposes. The frames were defined, simulated, analyzed, and designed by analytical computer software (ETABS 2013). The analysis results were tabulated and presented according to maximum values of beam and column stresses and lateral story displacements. These analysis results were compared using graphical presentation. In order to get the frame with the minimum weight, the self-weight of braced frames were taken as percentage of unbraced frame weight. Then, the maximum story displacement of unbrace frames were obtained and compared by the same way. It was concluded that the weights of tube frame with diagonal bracing and V-shape bracing were reduced by 12.6% comparing with the unbraced tube frame. Also, the story displacement of rigid frame with cross bracing was reduced by 61% comparing with unbraced rigid frame.

المستخلص

في هذه الدراسة تم تطبيق ما تنص عليه المواصفات القياسية الأمريكية لمباني الحديد الإنشائية وذلك بأخذ تأثير أحمال الرياح على المباني الفولاذية العالية بناء على موقع وطبوغرافية ومكان الإنشاء للمبنى، ولأجل دراسة السلوك الإنشائي لهياكل مبانى عالية تم اختيار ثلاث أنواع مختلفة من هياكل المباني العالية بحيث تكون متساوية في الأبعاد والإرتفاع ، والهياكل التي تم اختيارها بغرض الدراسة هي: هياكل مثبتة، وهياكل حوائط القص، والهياكل الأنبوبية وكل نوع من أنواع الهياكل المختارة تمت دراسته باستخدام ثلاث أنظمة تقييد مختلفة وهي نظام التقييد المتقاطع، ونظام التقييد المائل ونظام التقييد على شكل حرف V أضف لذلك هيكل اخر من كل نوع لايحتوي على نظام تقييد ويعتبر بمثابة المرجع للمقارنة في هذه الدراسة، بعد ذلك تم تعريف وادخال ومحاكاة وتحليل وتصميم النماذج جميعها وذلك باستخدام برنامج تحليل انشائي في الحاسوب ETABS 2013 وتمت جدولة ورسم البيانات المخرجة من البرنامج لكل من القوى على عدد من الأبيام والأعمدة وايضا تم حساب الإزاحة الجانبية لكل طابق، إن جميع المخرجات تمت المقارنة بينها ودراستها في شكل رسوم بيانية، ومن أجل الحصول على أخف النماذج المدروسة وزناً تم قياس الوزن الذاتي لجميع الهياكل والمقارنة بينها ، ومن ثم وجد أن وزن المبنى الأنبوبيان ذوي التقييد مائل ووالتقييد على شكل حرف V ينقصان بمقدار ١٢,٦% مقارنة بالمبنى الأنبوبي الغير مقيد، أيضا المبنى المثبت ذو التقييد المتقاطع يقل بمقدار ٦١% في إزاحة الطوابق مقارنة بالمبنى المثبت الغير مقيد.

DEDICATION

To the one who always supports me

(My Father)....

To the one who raises me since I born

(My mother)....

To the one who never stops advising me

(My Supervisor)....

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My deep thankful and grateful to mighty god Allah to give me the patience and success to complete this work, and inspiring me with thoughts that I would never think of it without him. I attribute the level of my Master's degree to his encouragement and effort and without him this thesis, too, would not have been completed or written.

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