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Steel Shear Wall System with a System of Diverging and Converging Winds

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Abstract: Buildings and new development has received much attention in recent years. In this regard, a variety of structural forms that came from Wind Band truss system is staggering. Member of this system, floor truss depth that are all mouth. Lateral load bearing steel building systems, and control clauses are bending the frame. Steel parts of the wind system That the resistance to lateral forces of the wind in a number of Frames in each building along with the diaphragm and the rigid foam structures can be aligned The inhibition was considered. Designers in one or more openings in a class of off-axis system and one or more openings along the axis of Wind Band have used two kinds of wind. Since the behavior of this system with a coaxial system is different, basically using this system in combination with a coaxial system in a direction and a plan is completely rejected and cause unusual behavior in the structure during an earthquake. This paper investigates the shear walls Steel, Wind of convergent (CBF) and inhibition of divergent (EBF), a combination of wind with other structural systems, we

Key words: Wind Band, shear walls, convergent, divergent, bending, lateral-structure

Shear wall Steel:

Of carbon steel that is 0.2 percent, to make Wire, tube and sheet steel is used. Average 0.2 to 0.6% carbon steel and To make the rails, boiler and building blocks are used. Carbon steel that is 0.6 to 1.5 percent, and it is difficult to build tools, springs and cutlery Used. Refined molten iron with the addition of certain amounts of carbon and The alloy metals such as Vanadium, Chromium, Titanium, Manganese And Nickel Converted to steel. Ones. Special steels may Mo, Tungsten Or Other metals have. This type of steel used for specific purposes Fall. At high temperature, iron and carbon together, the iron carbide (Fe_3C) Form. This reaction, Reversible.

If that Smantyt steel is slowly cooled Be, composed of iron and carbon balance in the side, displaced, Carbon In Polk Graphite Separate And the metal, the color gray. Conversely, if the steel is rapidly cooled, carbon The bright colors that are mostly Smantyt, remains. Smantyt decomposition temperature To the extent that it actually does not do normal. With steel Smantyt is graphite which is of steel, is harder and very brittle. Per One of the two types of steel, carbon can be adjusted within a relatively wide range. Also, the total amount of carbon can be changed in different parts of a piece of steel and Properties made it better. The bearing is made up of medium hardness and strength of steel But in the context of carbon and its surface is heated to form a thin layer of Smantyt up on it and it will be added.

Steel shear walls in Cutting forces in dealing with class structures and the lateral load resistance of the wor Iv. Is due to the above charges. Instead of using the classification system control Typical concrete shear walls, wind paragraphs X, Wind Band eccentricity and Bending the frame of the countries that benefit from this forward in the U.S. And Japan. Moment frame system compared to about 35 percent and 50 percent in some places the savings in steel consumption in buildings is associated with. The Executive The system is very simple and no special complexity in its implementation there. Steel shear walls can be implemented in concrete buildings where Wall of concrete cutting requires a lot of time, the system will run faster and cleaner. The system of all the positive characteristics such as convergent and divergent Wind Band x, v, 8 In terms of efficiency and is able to run and in many cases has better performance, A - System has very high ductility and the So much energy is absorbed and the system can be very economical The optimum resistance against lateral loads. B - basic system is very difficult Is high and therefore the lateral displacement of the structure decreases and the system totally Is rigid as well. C - compared with reinforced concrete shear walls is much lighter and The building is low weight and consequently less force when the columns and foundations Enter the earthquake. D - Because of the belt or in the welding Shear walls and steel is very high speed and reduced

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cost structure and All these results show that the system has good efficiency. E - Due to the low thickness Steel shear walls with reinforced concrete shear walls in terms of architectural spaces less Will occupy the building, especially in wall thickness, cutting down on the floors above Especially in the lower class is large and takes up space. F- In comparison with Reinforced concrete shear walls, shear walls and steel much faster and easier to implement, to Particularly where buildings are at risk for earthquakes. G - System Has a higher efficiency compared to other types of bracing. The system also Cold regions where temperature is below zero and there is a very good chance of freezing concrete and Economy. Capacity for steel shear walls Counteract the forces caused by earthquakes, storms and explosions in other systems such as Special moment frame is at least 25 percent more.

2 - Inhibition of Convergent (CBF) and Inhibition of Divergent (EBF):

Lateral load bearing steel building systems, and control clauses are bending the frame. Bracing frames are generally divided into two categories:

A - frame without leaving the center with the inhibition of the CBN - Concentrically braced fames B - number of frames out of the control center (EBF - Eccentrically braced fames)

These are the two most common systems but their use is not always possible. Inhibition of these other clauses such as the knee (kbf) with Mira's surrender (YDBF) with shape memory alloy (SMA) systems with semi-active (SA) exists.

Paragraphs steel containment system, including That the resistance to lateral forces of inhibition in a number of Frames in each building along with the diaphragm and the rigid foam structures can be aligned The inhibition was considered. Convergent and divergent wind is divided into two types of investment. At Members package includes the inhibition of convergent extension June, and Wind Band the converging point of a cross Said. Among the benefits of converged Wind Band include:

A- High structural stiffness B - side shift control structures largely Disadvantages include the inhibition of convergent paragraphs:

A- limits of architecture Create popup B - due to the high hardness and low plasticity of this containment dams As a result of their reduced ability to attract and repel the force of earthquakes and vibrations in structures Rises. Wind Band in divergent The following types can be used: Wind Band divergent at least at one end Wind of the Persian month Tir and are connected at the intersection of July and the end nodes connected to Wind Band No. Wind Band converge to increase the flexibility of the bracing The energy of the earthquake and the disposal is done better. Plasticity in this Wind Band by the current head of the Persian month Tir 2 Wind Band Wind Band or between the column and the Persian month Tir Takes. During the Persian month Tir Interface Now it is being formed by bending moment and the interface is low during the Persian month Tir It occurs by shear forces. AN interface by the forces of The inhibition was non-linear behavior of the modified forms were then much of the Persian month Tir We are taking the same form factor, non-elastic seismic forces will be repelled. Course This will strengthen somewhat in the Persian month Tir AN to be transformed, but the mechanism Prevent it. The use of architectural views Wind Band inhibition of paragraphs 7 to 8 again shows greater potential for embedding Provides windows. But in terms of instruments containing provisions relative to Wind Band 7 8 Change places, and the frame transmission can be increased. At Opening on the first floor Wind Band 8 (a) will not, but Wind Band 7 First floor space will be limited to the first opening. Second, connect to Wind Band Foundation of steel sheets used

Coaxial Wind Band behavior, is rigid. Wind Band behavior, but non-coaxial, is flexible. The law of the simultaneous use of two types of lateral load in a direction Wind Band is prohibited. The class members analyzed Wind Band cut diagonally into the wind section and a horizontal component to be one of the Qataris. Then at the height of the crater floor to be multiplied to obtain the vertical component. Wind Band combined time for the pressure builds more and more critical is the traction control. Special Regulations 2800 and bracing design criteria to be considered 10 topics such as: A - distance between the thin slice authorized under section 10-1-5-4 (b) 123 kg per square centimeter for single- Wind Band profiles obtained. B - Wind Band 7 and 8 to 1.5 times the force of the earthquake design are and July with the opening of the containment dams are to be able to without containment dams times gravity have to endure the beams of this harness strap should then design a bit stronger already being considered. C - Wind Band openings in the middle frame to be more due to the force of gravity in this column, this column may reduce the long occlusion. D - Special rules for certain bracing members 10 to be topic of 10-3-10-2 and reduce stress permitted in the B coefficient is multiplied. Inhibition of the analysis and the results are hard to frame with Wind Band: A - Applying the clauses can contain up to 10 percent of the frame adds stiffness and control of more than one row of the same

size can also be helpful in raising hard covers. B - If the frame should be run with Wind Band beam column joints of the joint force to be anchored to the transmission of the beams does not find .. C - The use of inhibitors of the frame must contain columns for the parties to bear the anchor of the lateral loads are resistant design. Reducing distances and aligned with the openings Wind Band .Wind Band and using a factor of larger systems (for example, contain provisions diverging from the provisions contained rather than converged with R = 7 R = 6) in building construction can reduce the long occlusion and increased confidence in the upside.

Wind Band converge to y (Wind Band curtain and tent), the horizontal lateral load on the frame, which is specially treated to produce tensile force or compressive force in three of its members simultaneously. Since this type of bracing, it refers to the proper functioning of its members has been produced in the stretch. Due to the limited horizontal component of tensile force Wind Band to cut 70% of the 2800 standard, which is bracing for a pressure of at least 30% cut in general suffered from the earthquake to use a pair of symmetrical Plans for building the steel frame is acceptable. Buckling out of the frame, most likely reducing the load bearing side of the bracing. Given the importance of consuming a significant amount of time in the bracing members fulcrum bending buckling of plates, sheets, there is a connection with members on both sides, elastic and non elastic buckling load is calculated. Y-shaped bracing for the potential of significant lateral load on the generator is bracing members. The maximum elastic buckling load per point of convergence on the full diameter of the member. Global convergence of three members of the moving block, the junction of beam and column framing, elastic buckling load decreases. Elastic buckling load in all cases the geometry of the harness strap is submitted. The non-elastic buckling bracing is possible.

Openings in the beams bracing bracing system designed to coax just like any other ordinary beams under gravity loads is done in a combined time of earthquake force in the beams is not significant, but in addition to cutting out the gravity loads, in and seismic load combinations of axial forces in the bracing and anchor a series of additional cuts in the beams and the crisis is caused by the earthquake load combination is to design the beams. A critical location at the junction of the beams is Wind Band to July and the location of the upper and lower wings are generally required reinforcing steel.

One of the most important and sensitive issues in the international system, is designed to joist connection, a problem that most designers to easily pass along it. Some issues that must be considered in relation to joist design, are as follows:

A- Communication joist should be able to compress all of the sections.
B- John interface should be part of a single sheet without any additional sheets and the formation of any open-laundering should be placed in John's piece interface
C- end component interface that is connected to the diagonal member, the hard lives of the height, is placed on both sides

Bracing out of alignment in this way to be a designer to your liking some eccentricity (e) in Wind Band type 7 and 8 (or ANOVA as the other), provided that, so that the anchor bending and shear force during short of firing (ie, e) which related to the joist (Linkbeam) occur. Joist bending moment due to the flow of communication may be in relation to this moment (Momentlink) occurs. Or if length (e) is now being cut too short in this case occurs between the shear (Shear link) is. Thus the controlling joist connection ductility, ductility for the structural reliability, earthquake achieved. The 2800 regulations for the structural system ductility factor is R = 7, the coaxial system with R = 6)) is about 15 percent more of the same issue will reduce the base shear.

3- In Combination with Inhibitors of Other Structural Systems:

A - Composition of the Plan:

Designers in one or more openings in a class of off-axis system and one or more openings in the other parallel to the first type of Wind Band. Wind Band have used coax. Since the behavior of this system with a coaxial system is different, basically using this system in combination with a coaxial system in a direction and a plan is completely rejected and cause unusual behavior in the structure during an earthquake; So, if you wish to use this type of bracing system is in the plan, bracing all openings to the outside of their design. This prevents the use of moment frame systems combine the system with a dual system and the coefficient of R = 7.5 or using a robust system with a different direction orthogonal to the axis of the system output is used, it is not.

B - Combination of Altitude:

Second law of combining this system with other systems in height, is completely prohibited, except in the following cases:

A- 5 floor, the higher the output for Wind Band .Wind Band last floor joist to the center and the design of communication.

B- 5 floors above the first floor of a Wind Band output can also be driven if it can be demonstrated that the elastic capacity 50 percent larger than the capacity to be submitted to the floor above the first floor.

C - Beams in the Span of Bracing:

Control system design based on the time axis beams in the span of control to other beams normal grading is done under gravity loads and seismic forces in combination at substantially the beams will be created, but the external system in addition to cutting gravity loads, The combined times of earthquake and axial forces developed in a series of dams to control the anchor and cut the beams may be causing additional critical times of the seismic design of these beams are combined. A critical location at the junction of the beams is Wind Band to July and the location of the upper and lower wings are generally required reinforcing steel.

4 - Concrete Shear Wall Design:

A. Fully integrated wall pier and spandrel design
A. ACI, UBC and Canadian Codes
B. Design for static and dynamic loads
C. Automatic integration of forces for piers and spandrel

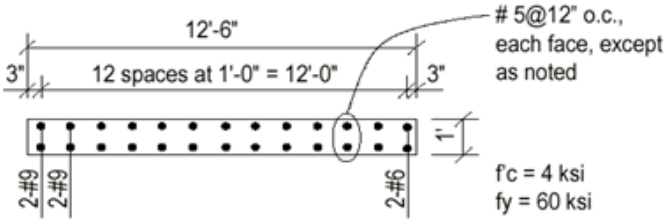

Fig. 1:

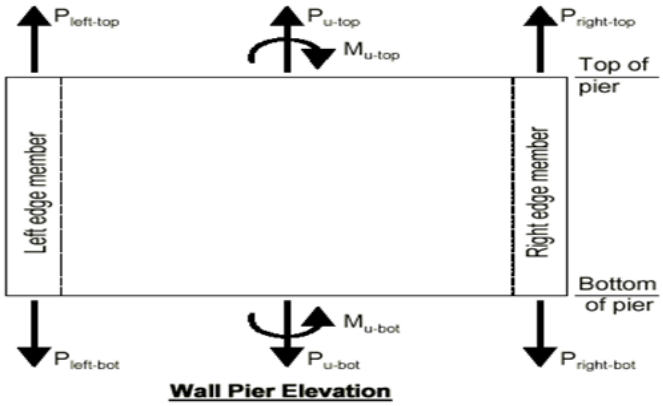

Fig. 2:

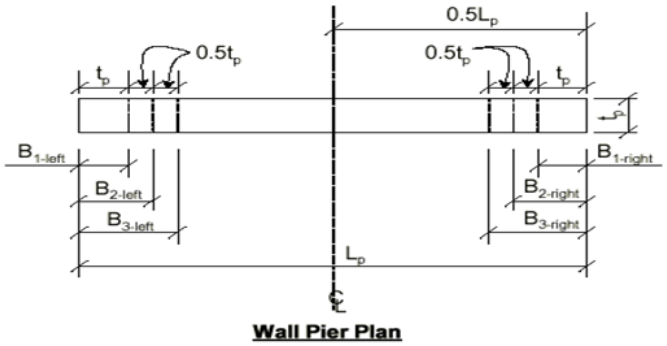

Fig. 3:

5 - Shear Wall - Typical Design Process:

A. While modeling define Shear Wall elements B. Choose the Shear Wall design code and review other related preferences and revise them if necessary C. Assign pier and spandrel labels D. Run the building analysis E. Assign overwrites F. Select Design Combos

Start Designing Walls:

A. View Design Input and Output Information B. Design the Member Interactively C. Print Design Report D. Change Design Section if Required E. Re-run Design and Re-analyze if needed F. Repeat the Above Cycle

6-Factors Effecting Slenderness Effect:

Effective Length:

A. Actual Length B. End Framing and Boundary Conditions C. Lateral Bracing Conditions

Effective Stiffness:

A. Cross-sections Dimensions and Proportion B. Reinforcement amount and Distribution C. Modulus of Elasticity of Concrete and Steel D. Creep and Sustained Loads

Loads:

A. Axial Load B. End Moments and Moments along the Length

Conclusion:

Proper use of the bracing system further structural ductility and earthquake base shear is reduced. The proper design of inhibitors of bracing and heavier than the control beam is centered as well. Shear walls, steel moment frame systems, compared to about 35 percent and 50 percent in some places, the saving in buildings with a steel. At Members package includes the inhibition of convergent extension June, and Wind Band the converging point of a cross They. Use of architectural views Wind Band of 7 to 8 again shows greater potential for embedding Provides windows. But from the perspective of seven instruments in Wind Band 8 Change places, and the frame transmission can be increased. Wind Band coaxial, is rigid. Wind Band behavior, but non-coaxial, is flexible. Special Use Regulations 2800 and bracing design should be considered 10 topics. Wind Band combined time for the pressure builds more and more critical is the traction control. Reducing distances and aligned with the openings Wind Band and the behavior of larger systems with multiple high amount of condensation in building structures can be reduced and increased safety factor against overturning. One of the most important and sensitive issues in the international system, is designed to joist connection.

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