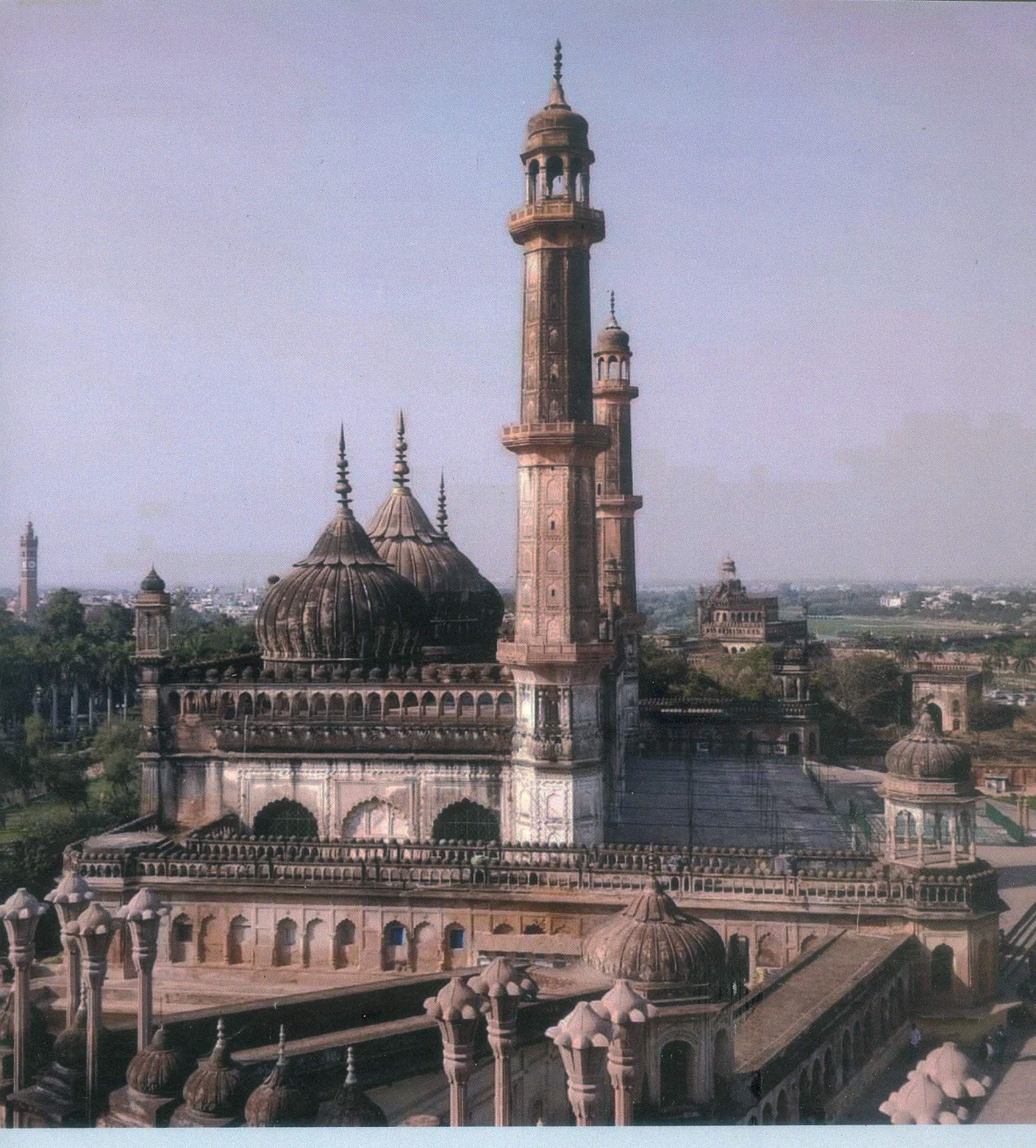

Buildings Under Dynamic Loads

By: Tabish Izhar

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Tabish Izhar
Department of Civil Engineering
Integral University, Lucknow (U.P) INDIA

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Tabish Izhar, Department of Civil Engineering, Integral University, Lucknow (U.P.), India
Samreen Bano, Department of Civil Engineering, Integral University, Lucknow (U.P.), India

Construction is a vital part of every developing country in this era. Every country has specific building design codes which provide the standards to engineers for the design of various structural components like the beam, column, and slab. Analysis and design Reinforcement concrete building of every country is based on their geographical location. Seismic forces are one of the major natural forces causing huge damage to lives and economy. So that one can understand the difference and can appropriate for best guidelines for safety to lives and economy. In today's world of globalization, an engineer must be efficient enough to understand and handle different codes. In this paper, a comparative study is presented for analysis and design of reinforced concrete building under seismic forces for four codal Guidelines (IS 1893:2002, Euro code 8, Japan-2007 and ASCE: 7-10) using Staad Pro. The comparative study includes the comparison building base shear, bending moment, and shear force, percentage of steel, required area, displacement, and story-drift. For seismic Analysis and design, the building elements like beam and column are also compared using these countries RC building code.

SEISMIC BEHAVIOUR OF RE-ENTRANT CORNER WITH OPENING IN DIAPHRAGM ON RC BUILDING

Rajiv Banerjee, Department of Civil Engineering, Integral University, Lucknow (U.P.), India

Faisal Zia, Department of Civil Engineering, Integral University, Lucknow (U.P.), India

The most important cause of damage of RC buildings during earthquake is the irregular building configuration. An RC building which are unsymmetrical and has lack of continuity in geometry, mass or load resisting elements is called as irregular buildings. This obstructs the flow of inertia forces and cause lots of damage to buildings. There are many studies carried out irregular buildings in seismic zones, but still more research is needed in this field. Therefore, this study is about the seismic response of reinforced concrete structures having combination of two plan irregularities, re-entrant corner and diaphragm discontinuity buildings. Study is performed combining this two plan irregularity criteria and analyzing the results in seismic zone 4 and 5. For this 1 is regular building, 3 re-entrant corner buildings with three variations in A/L ratio, three buildings with openingin diaphragm with three varying percentage of opening. 9 structures are made combining these buildings with the combination of two irregularities. Structures are analyzed in Etabsoftware by response spectrum analysis. Parameters such as story displacement, story drift, base shear, overturning moments are determined and compared with regular buildings.

DETERMINATION OF THE OPTIMUM POSITION OF SHEAR WALL IN A MULTISTORY BUILDING WITH REENTRANT CORNER

Rishabh Srivastava, Department of Civil Engineering, Integral University, Lucknow (U.P.), India

Rajiv Banerjee, Department of Civil Engineering, Integral University, Lucknow (U.P.), India

Meraj Ahamad, Department of Civil Engineering, Integral University, Lucknow (U.P.), India

The thesis is based on a comparative study of configuration of shear walls for buildings irregular in plan. With the increase in demand of high rise buildings, the concern for safety also increases. High Rise Buildings are vulnerable against lateral forces like wind load and seismic loads. To ensure safety against these factors, many tools are applied in the structure. Shear Wall is a vertical planer structural element which is used in structures to induce lateral stiffness. The effectiveness of shear wall is based on its location in building. Specially in building where there is inborn eccentricity, location of shear wall becomes very important. This gives birth to optimum location or optimum configuration of shear wall in building. In this thesis, we have studied various configuration of shear wall in a building with irregular plan (L shape). For the study, we have considered ten test models, out of which one model is not having shear wall. This model is called bare frame. From the bare frame model other nine test models with shear wall is compared in order to define the optimum location of shear wall for

PUSHOVER ANALYSIS OF A REINFORCED CONCRETE BRIDGE

Md. Tasleem, Department of Civil Engineering, Integral University, Lucknow (U.P.), India

Mohd Farhan, Department of Civil Engineering, Integral University, Lucknow (U.P.), India

Seismic vulnerability assessment of existing structure has gained nation-wide attention, particularly after 2001 Gujarat Earthquake and 2005 Kashmir Earthquake. There are many literatures available on the seismic evaluation procedures of multi-storeyed buildings using nonlinear static (pushover) analysis. There is not much effort available in literature for seismic evaluation of existing bridges although bridge is a very important structure in any country. In order to evaluate existing bridges and to suggest design of retrofit schemes performance based nonlinear pushover analysis is applied in some international codes but no such inclusion is found in Indian Codes.

In order to draw comparison between pushover analysis schemes with Indian method of seismic analysis, the present project aimed to carry out a seismic evaluation of RC bridges using nonlinear static (pushover) analysis. The two series of model bridges are analyzed using displacement coefficient method (FEMA 356), capacity spectrum method (ATC 40), displacement modification method (FEMA 440) and equivalent linearization method (FEMA 440). Each series consist of five bridges one with varying span and otherwith varying pier height. Some of the analysis parameters were suitably modified to use in a bridge

STUDY ON DOMINANCE OF WIND AND EARTHQUAKE ON BUILDINGS HEIGHT

Md. Tasleem, Department of Civil Engineering, Integral University, Lucknow (U.P.), India

Khalid Masood, Department of Civil Engineering, Integral University, Lucknow (U.P.), India

This book chapter describes the behaviour of multi-storeyed buildings under naturally occurring wind and earthquake loads Using the software ETABS, the simulation was a multi-storeyed building which is experiencing a basic wind speed of 55 m/s and is located in an Earthquake Zone V. Multi-storeyed buildings today are designed to withstand earthquake forces using the recommendations suggested by the IS 1893(Part1): 2016 code or to withstand the wind forces by using IS 875:2016 code for wind loads, in order to ensure that it remains an economical endeavor. The data from the simulation has helped us identify the approximate height of a building at which wind loads trump the effects of earthquake load as well as determining which design parameters are best suited for low-rise and high-rise buildings.

An approximate 2.4% of earth's land is occupied by India while contributing 17.5% to the world's population making it one of the most densely populated large countries in the world. As of 2018, World Bank census data suggests that 454.93 people reside per square kilometer. The ever-increasing population has led to an acute shortage of land prompting the advent of high rise residential and commercial towers. Moreover, India has a very diverse landscape which is subject to various different weather and natural phenomena such as Hurricanes, storms,

ANALYTICAL STUDY ON SEISMIC BEHAVIOR OF HIGH-RISE BUILDING USING DIFFERENT LATERAL LOAD RESISTING METHODS

Md. Tasleem, Department of Civil Engineering, Integral University, Lucknow (U.P.), India

Kumar Anupam, Department of Civil Engineering, Integral University, Lucknow (U.P.), India

As the population is increasing tremendously with every passing year and the land available for use of habitation is the same as it was a decade ago. Due to this, metro cities are getting densely populated day by day. So, the only solution to the problem is vertical growth. Now this need for the increase in the vertical height of the buildings has made the buildings tall and slender. Since buildings are getting taller and slender the primary concern of design engineers is shifting from gravity loads to lateral loads. The effect of lateral forces becomes more and more dominant as the building becomes taller and taller. Hence, traditional simple framed structures have now been replaced by complex but yet more effective structural systems that perform better in case of lateral load. The lateral load resisting system effectively control the excessive drift due to either wind or earthquake and thus minimizes the risk of damage to building. The objective is to study, the performance of lateral load resisting system in high-rise building subjected to seismic load. Study of the literature is reviewed in this paper on various aspects of lateral load resisting system as; Behavior of lateral load resisting system in High-Rise RC building,

COMPARATIVE STUDY OF FLAT SLAB BUILDING WITH SHEAR WALL AND BRACING

Md. Tasleem, Department of Civil Engineering, Integral University, Lucknow (U.P.), India

Md Shahzar, Department of Civil Engineering, Integral University, Lucknow (U.P.), India

Earthquake is the natural calamity; it produces strong ground motions which affect the structure. Provision of shear walls and bracings are installed to enhance the lateral stiffness, ductility, minimum lateral displacements and safety of the structure. Story drift and lateral displacements are the critical issues in seismic design of buildings. Three types of frame models aredeveloped and evaluated by static analysis by ETABS. In the present work G+24 multistory building is analyzed by using shear wall and bracing. Main purpose of this study is to compare the seismic response of the structure. As the population is increasing tremendously with every passing year and the land available for use of habitation is the same as it was a decade ago. Due to this, metro cities are getting densely populated day by day. So, the only solution to the problem is vertical growth. Now this need for the increase in the vertical height of the buildings has made the buildings tall and slender. Since buildings are getting taller and slender the primary concern of design engineers is shifting from gravity loads to lateral loads. The effect of lateral forces becomes more and more dominant as the building becomes taller and taller. Hence, traditional simple framed structures have now been replaced by complex but yet more

SEISMIC RESPONSE OF IRREGULAR BUILDING ON SLOPING GROUND

Anjit Singh Chauhan, Department of Civil Engineering, Integral University, Lucknow (U.P.), India

Rajiv Banerjee, Department of Civil Engineering, Integral University, Lucknow (U.P.), India

Rapid urbanization and increased in population density led to the construction of multi-storey buildings on sloping ground. Construction of buildings on hill slopes is more complicated for the structural engineer; specially load due to presence of powerful earthquake in addition to the force of sliding slope itself. Because of the limitations posed by the topography conditions, buildings located on hill slopes have highly irregular in both horizontal and vertical planes in comparison with buildings located on flat terrain. This research work aims at to presenting the effect of different slope angles with irregularity i.e. Vertical geometric irregularity, Mass Irregularity, Diaphragm Irregularity and combine irregularity on the performance of stepback RCC building under seismic and gravity loading in order to find the more vulnerable frame and less vulnerable frame irregularity on sloping ground. The study is focused on seismic response of multi-storey RCC(G+10) stepback building with Irregularity as vertical Geometric irregularity, Mass Irregularity, Diaphragm Irregularity and combine of vertical geometric, mass & diaphragm irregularities located on sloping ground with varying angles (i.e. 20°, 30°, 40° & 45°). The method used for analysis was Response spectrum method.

P-DELTA ANALYSIS OF FLAT SLAB AND R.C. FRAMED BUILDINGS

Md. Tasleem, Department of Civil Engineering, Integral University, Lucknow (U.P.), India

Kanchan Gupta, Department of Civil Engineering, Integral University, Lucknow (U.P.), India

Common practice of design and construction is to support the slab by beam and beam is supported by column. This type of construction is called beam column construction. But in flat slab design we are constructed without beam i.e. the beam reduces the available net clear ceiling height of building. Two-way slab directly rests on column known as flat plates, in flat slab building formwork is simple as compare to normal slab (that means slab rest on beam column frame building) and reinforcement layout are also simple and storey height decreases. Current international design codes impose limits on the P-Delta ratio, which appear to have been set to ensure a minimum reloading stiffness during cyclic response and with due consideration for the likely ductility demands imposed on structures. Whilst the current code limits may be reasonable for normal height structures, it is argued that the code limits should be reconsidered for tall buildings owing to limited displacements that real earthquake ground motions impose on such buildings. In the present work The second order effect is the additional action in the structure due to the structural deformation by virtue of the applied loads which is also known as P-Delta effect. The P-Delta is a non-