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STATIC PUSHOVER ANALYSIS AND PERFORMANCE EVALUATION OF RC FRAMED STRUCTURES USING OPENSEES

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ABSTRACT: Engineering structures are very difficult to analyze for their dynamic or vibration behavior since they are very complex. In the last couple of decades alone in India, with the incidental loss of life and property witnessed due to failure of structures caused by earthquakes, now attention is given to neglect the adequacy of strength in RC framed structures to resist strong ground motions. To determine structural response beyond yield point, out of two types of nonlinearity material and geometrical. As such, nonlinear analysis can play an important role in the analysis and design of new and existing buildings. In the present paper, studies on RC Framed structures with column support shear walls has been carried out. Initially shear walls are used in reinforced concrete building to resist wind force. Since building with shear wall gives excellent performance even under seismic force, shear walls are extensively used for all earthquake resistance design. Shear wall impart lateral stiffness to the system and also carry the gravity load. When design for wind loading, the location of shear wall in building plan does not play important role. In case of Seismic loading, location of shear walls plays a critical role. Under wind loading, a fully elastic response is expected, while during strong earthquake significant inelastic deformation are anticipated. Hence, in this paper, Column support Shear walls are placed at different locations in RC frames of G+6 Storey building and analyzed for seismic action and also subjected to static pushover analysis and observed the seismic performance parameters such as storey drift, storey shear, base shear, top displacement and peak ground acceleration of the structures using Open SEES. This paper aims to find the optimum location of shear walls which can be determined with the help of seismic performance parameters. The torsional effects in a building can be minimized by proper location of vertical resisting elements and mass distribution. Shear walls should be employed for increasing stiffness where necessary and be uniformly distributed in both principal direction. Multi-storied RCC building shear walls are now fast becoming as popular as an alternate structural form for resisting the earthquake force. Civil Engineering structures are designed to withstand environmental forces like earthquake, along with gravity loads. These forces are random and dynamic in nature. Therefore the response of the structure is also dynamic and that is what causes the unsafe and uncomfortable conditions. So, performance based analysis of the structure is required which can be achieved by Static Pushover Analysis (SPA) in OPENSEES. From the static push over analysis, graph

of base shear to top displacement is plotted. From the graph, base shear capacity of the building is to be found out.

Keywords: *Base Shear, Open SEES, Seismic Performance Evaluation, shear walls, Static Pushover Analysis*