Analysis and design of G+4 RCC two wheeler showroom building in different zones and soil conditions

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Abstract:

India is a subcontinent with more than 60% of its land area classified as seismically active. The effects of earthquakes on structural analysis and design are significant. The process of determining how a structure will behave under specific load combinations is known as analysis. The process of determining the right requirements for the building is referred to as design. It would take a long time to analyse and develop a structure manually. Any structure's study and design may be completed rapidly with the help of software. The goal of this research is to analyse and build a G+4 two-wheeler RCC showroom in each of India's four seismic zones. This study describes the nature of commercial building when seismic load is added , as demonstrated by story drift and foundation shear. STAAD Pro software was used to do seismic analysis on the (G+4) building. The study's building model features four stories and a basement. The standard storey height is 3 m, while the bottom storey height is 3.75 m.
Key words: G+4 two-wheeler RCC showroom, base shear, storey displacement, storey drift, force shear

1. Introduction

An earthquake-proof design is the building or structures that do not sustain damage after a violent but occasional earthquake. The goal of designers is to develop seismically resistant structures that will stay undamaged even in the event of a rare but powerful earthquake. Such constructions will be extremely sturdy and costly. The goal of earthquake resistant design should be to develop structures that will always respond elastically and withstand large earthquakes throughout their lifetime without collapsing. Building materials used while construction should be ductile enough to absorb and spread the energy via post-elastic deformation to avoid collapse after a big earthquake. [1] The design code [IS 1893 (Part1) 2016] is the most recent version of the seismic zoning map, with four seismicity zones, and so India is divided into four zones: 2, 3, 4, and 5, as opposed to five or six zones in prior editions. The maximum level of seismicity occurs in Zone 5, while the lowest level is in Zone 2. Zone 2 is regarded to have the lowest impact risk zone and is hence sensitive to MSK VI or below. It has a zone factor of 10 and is well-known. The IS code allows a structure in this zone to experience horizontal ground acceleration equal to 10% of gravitational acceleration. The Indian Ocean islands of Andaman and Nicobar, as well as sections of Kashmir and the Western Himalayas, are all part of Zone 3. This area has a zone factor of 0.16, according to the IS code. This zone is prone to harm as a result of MSK VII's impact. Zone 4 is classed as a "High Damage Risk Zone" because it contains MSK VIII-