

Seismic Considerations in Case Study of Kindergarten Building Design: Ensuring Safety and Structural Integrity

Authors : Al-Naqdi Ibtehal Abdulmonem, Hameed Reem Majeed

Abstract : Kindergarten buildings are essential for early childhood education, providing a secure environment for children's development. However, they are susceptible to seismic forces, which can endanger occupants during earthquakes. This article emphasizes the importance of conducting thorough seismic analysis and implementing proper structural design to protect the well-being of children, staff, and visitors. By prioritizing structural integrity and considering functional requirements, engineers can mitigate risks associated with seismic events. The use of specialized software like ETABS is crucial for designing earthquake-resistant kindergartens. An analysis using ETABS software compared the structural performance of a single-story kindergarten in Iraq's Ministry of Education, designed with and without seismic considerations. The analysis aimed to assess the impact of seismic design on structural integrity and safety. The kindergarten was designed with seismic considerations, including moment frames. In contrast, the same kindergarten was analyzed without seismic effects, revealing a lack of structural elements to resist lateral forces, rendering it vulnerable to structural failure during an earthquake. Maximum major shear increased over 4 times and over 5 times for bending moment in the kindergarten designed with seismic considerations induced by lateral loads and seismic forces. This component of shear force is vital for designing elements to resist lateral loads and ensure structural stability.

Keywords : seismic analysis, structural design, lateral loads, earthquake resistance, major shear, ETABS

Conference Title : ICCSEE 2024 : International Conference on Civil, Structural and Earthquake Engineering

Conference Location : Istanbul, Türkiye

Conference Dates : August 15-16, 2024