

学术论文

智利地震钢筋混凝土高层建筑震害对我国高层结构设计的启示

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摘要:

2010年2月27日在南美洲智利发生的8.8级大地震, 造成了钢筋混凝土高层建筑的严重破坏, 这是近年来现代钢筋混凝土高层建筑经历的最大地震, 引起了国内外工程设计人员的广泛关注。以智利高层建筑结构体系特点入手, 分别介绍了智利地震中钢筋混凝土剪力墙高层建筑、立面收进复杂高层建筑、连体复杂高层建筑、带消能减震支撑超高层建筑、带金属球颗粒阻尼器高层建筑的震害现象。研究表明: 智利高层结构剪力墙厚度与中低层结构剪力墙厚度相近, 造成剪力墙轴压比过大, 在此次地震中发生严重破坏; 智利国家规范在钢筋混凝土剪力墙设计中参考美国规范, 但允许对边缘约束构件设计予以放松, 是造成剪力墙破坏的另一原因。另外从此次大地震中复杂高层和消能减震结构的表现来看, 我国仍需加强对复杂及超限高层的抗震性能研究, 加强消能减震技术在我国高层及超高层中的应用。

关键词: 智利地震 钢筋混凝土 高层建筑 复杂高层 剪力墙 消能减震 震害

Lessons learnt from damages of reinforced concrete tall buildings in Chile Earthquake and revelations to structural design in China

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Abstract:

An 8.8 magnitude earthquake hit Chile on 27 February 2010 and caused a lot of damages to reinforced concrete (RC) tall buildings. It is the maximum earthquake that modern RC tall buildings have suffered in the world, which has attracted the global attentions of structural engineers and earthquake engineers. The structural characteristics of Chilean RC tall buildings were introduced first. Then this paper analyzed damage patterns of shear wall buildings, a complex tall building with setbacks, a multi-tower connected complex building, a super-tall building with energy dissipation braces, and a tall building with metal ball particle energy dissipation system. It is found that in Chile the widths of the shear walls for tall buildings are almost the same as those for low-rise or middle-rise buildings. The axial compression ratios of the shear walls are very high which caused the serious damages to shear walls. In Chilean codes, the design of shear walls refers to US code but permits the design flexibility of boundary element in shear walls, which is another important reason that caused the damages to shear walls. And from the seismic performance of complex tall buildings and energy dissipation buildings in Chile earthquake, the study on the complex tall buildings should be strengthened and the application of energy dissipation technology in tall building is suggested to be widely promoted.

Keywords: Chile Earthquake reinforced concrete tall building complex tall building shear wall energy dissipation damage

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