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Akira Wada is a member of structural engineering research center at Tokyo Institute of Technology. He graduated from the department of architecture and building engineering at Tokyo Institute of Technology at 1968 and the master course at 1970. He became a member of structural engineering division of Nikken Sekkei Ltd., one of large architecture and engineering design firm in Japan. He got a degree of doctor of engineering at 1981. He returned to Tokyo Institute of Technology as an associate professor, 1982. He was promoted to a professor at structural engineering research center of same Institute in 1989. He had been staying in USA as a foreign lecturer at the University of Washington on 1984 and as a visiting professor at Massachusetts Institute of Technology on 1991. His research interests are structural engineering of architectures and buildings, seismic design, seismic isolation, damage controlled design and computer simulation of structures. Architectural Institute of Japan gave a research award of 1995 for his work “Analytical and experimental researches of nonlinear behavior of building structures”. Architectural Institute of Japan gave an engineering award of 1993 for the work of his colleagues and him “Invention and realization of damage controlled structures”. He is one of most active researchers in seismic design of building structures in Japan and he is a chair or a member of many research committees concerning these fields in Architectural Institute of Japan, Japan Society of Seismic Isolation, Building Center of Japan and Japan Society of Steel Construction. Now, he is a collective member of the Science Council of Japan.

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Seismic Design for Resilient City

Introduction

The Industrial Revolution started in the 18th century in Britain. We exceeded modern ages, and had arrived at the present age. Now, People in the world are living in the multistory apartment houses and making jobs in the high-rise office buildings, too. The earthquake hardly occurs in Britain, France, and the east coast of the United States. The civilization extended to the west coasts of the United States and Asian countries, it came to build a lot of buildings. Population increased in the big city. Then, many big seismic hazards have happened in the 19th and 20th centuries.

Difficulties in reducing seismic disasters

Human life is about 80 years and building life is 40 to 100 years. Interval of big earthquake hitting one place is 100 to 2000 years. Optimists tend to think next big earthquake will not come while they are alive. It is easy understood that reducing seismic disasters is so difficult.

Seismic design of buildings

Each owner of a building thinks the performance of only his building in seismic design. The owner and structural engineers of his building consider the occurrence of big earthquake in his building life span. When the life span of building is shorter, the design earthquake level would be smaller automatically.

Seismic design for urban city

The seismic issues of a city cannot be solved if the seismic resistance of its individual building is determined only from the relationship between the life of a single building and the earthquake occurrence in its life span.

Could you apply largest level of earthquake to design of a building?

A criticism would arise from society if individual building is to be designed for the largest level of earthquake ground motion. Actions to legally demand excessively high seismic performance are interpreted as a violation of property right of people. Then, we need new technology having high performance without expensively cost.

Conclusions

Engineers and Researchers in the field of the earthquake engineering did many researches in these 100 years. The developments of the seismic isolated structures, the passive controlled structures and seismic retrofit technologies were advanced. We have high-speed computers and good software. We can use high & low strength steel, high strength concrete and new materials for building structures. Hereafter, we have to consider not only individual building but also the city, when we want to design resilient city against big earthquake. We have to apply these new technologies to all buildings in all earthquake prone countries.