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京都大学工学部建築学科、神戸大学大学院自然科学研究科（学位取得）

経歴

鹿島建設技術研究所、鹿島建設小堀研究室、カリフォルニア大学デーヴィス校客員研究員、東京理科大学講師（非常勤）、京都大学防災研究所講師（非常勤）、大阪大学教授、大阪大学名誉教授、1994年日本建築学会奨励賞（論文）、2006年日本建築学会賞（論文）、平成29年度大阪大学賞（教育貢献部門）

相談・講演・共同研究に応じられるテーマ

地震と被害、地震防災、地震に強いまちづくり、地震応答低減技術

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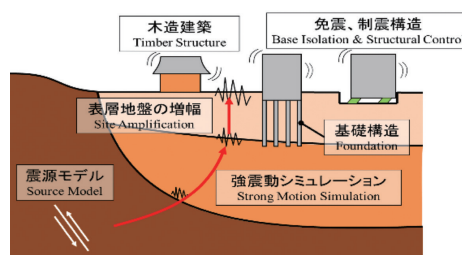


主な研究と特徴

「地盤・建物の揺れの予測とシミュレーション／地震に強いまちと都市づくり／月面レゴリスでの基礎設計と自動化施工」

逼迫する巨大地震への対策が急がれる中、地震に強い都市・まちづくりを目指す必要がある。このため、建設地盤の地震の揺れと建物の揺れを解明し、建物や都市・地域の耐震化研究をテーマにしている。研究では、極大地震での基礎地盤と構造物の非線形挙動を明らかにすることを目的に、模型実験や3次元非線形解析を行い、実証と解析の両面から研究を進めている。地震応答低減に関する研究では、基礎底面を地盤から絶縁させて地震入力を遮断し、基礎側面を強靱性と高減衰性をもつ変位制御材で支持する絶震基礎の開発も進めている。

また、過去の教訓として1948年福井地震での地盤と建物の被害を分析し、将来の大地震での被害予測と対策を検討している。さらに、将来を見越した研究では、月面都市の建設に向けて、地球の6分の1の重力場である月の砂（レゴリス）の特性を調べる研究や、月震への対策と杭基礎の自動化施工ロボットの開発を行っている。



今後の展望

南海トラフ巨大地震や活断層による都市直下地震への対策が急がれる現在、「地震を知り、地震に備える」を目的に、人命をまもり、都市の機能維持をはかる建築物の耐震化研究の高度化を推進する。さらに、将来の月面レゴリス地盤での建造物の建設に向けた基礎設計と自動遠隔施工の研究を進める。

Department of Architecture and Civil Engineering

Key words

earthquake damage prediction, earthquake disaster prevention, foundation-soil interaction, seismic response reduction, seismic retrofitting, lunar exploration base construction



Doctor of Engineering / Professor

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Education

Kyoto University, Faculty of Engineering, Department of Architecture, Kobe University, Graduate School of Science and Technology (Degree of Dr.Engineering obtained)

Professional Background

Kajima Institute of Technology, Kajima Kobori Research Complex, Visiting Researcher at University of California, Davis, Lecturer (part-time) at Tokyo University of Science, Lecturer (part-time) at Disaster Prevention Research Institute, Kyoto University Professor at Osaka University, Professor Emeritus at Osaka University, 1994 Architectural Institute of Japan Encouragement Award (Paper), 2006 Architectural Institute of Japan Award (Paper), 2017 Osaka University Award (Contribution to Education)

Consultations, Lectures, and Collaborative Research Themes

earthquakes and damage, earthquake disaster prevention, earthquake-resistant urban development, earthquake response reduction technology

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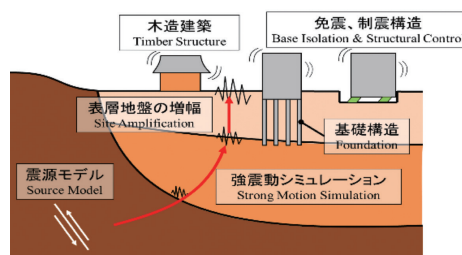
Main research themes and their characteristics

Prediction and simulation of earthquake response of ground and building／Creating earthquake-resistant cities／Optimal foundation design and automated construction on lunar regolith

Against the mega-earthquake, it is necessary to aim for the creation of cities that are earthquake-resistant. The research theme is to clarify the earthquake responses of both the ground and the structures. In order to clarify the nonlinear behavior of ground and structures, model experiments and 3D nonlinear analysis are being carried out.

In research on reducing earthquake response, the development of a seismic isolation foundation is being promoted, in which the bottom of the foundation is insulated from the earthquake input motion, and the sides of the foundation are supported by the materials that have high toughness and high damping properties.

In addition, as a lesson from the 1948 Fukui earthquake is being analyzed, and damage predictions and countermeasures for future major earthquakes are being considered. Furthermore, in research looking into the future, research is being conducted on the properties of lunar sand (regolith), which has one-sixth the gravity of Earth, in preparation for the construction of a lunar city, as well as countermeasures against moonquakes and the development of automated construction robots for pile foundation.



Future prospects

Now that measures against the Nankai Trough megathrust earthquake and earthquakes directly beneath cities by active fault are urgently needed, we will clarify the seismic responses of buildings during a major earthquake. With the goal of "knowing earthquakes and preparing for them," we will promote advanced research into earthquake resistance to protect human lives and maintain the functions of cities. Furthermore, we will advance basic research into the construction of buildings on the lunar regolith ground.