Research Project Summary

Modernization and Integration of the PEER Column Performance Database

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Start-End Dates:
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Abstract

The overarching goal of this project is to expand and modernize the PEER Structural Performance Database (SPD) for reinforced concrete (RC) columns, which was developed over 20 years ago. The amount of data will be greatly expanded by combining the data contained in the existing SPD with extensive databases compiled at University of California, Los Angeles (UCLA) and at the University of Washington (UW). The unified database will contain data from approximately 1,500 tests of columns, including 180 structural and material parameters, as well as full cyclic force-displacement histories for approximately 700 tests. In addition, the SPD relational database and interface will be updated with new tools for searching, visualization, data processing, and data exporting to support advanced analytics, such as machine learning, AI-assisted modeling, performance-based assessment and model development.

Deliverables

The main deliverable will be the database and accompanying website that will allow access and processing of the available data. A user guide and developer documentation will also be developed as part of this project.

Research Impact

The expanded and modernized SPD will substantially advance both research and engineering practice in several ways:

a) Structural engineers will gain immediate access to standardized, validated data for seismic performance assessment of RC columns and bridge piers in new and existing buildings.
b) Researchers can use the unified database for model calibration, machine-learning applications, and code development.
c) Industry and code-writing bodies will benefit from transparent, reproducible datasets supporting updates to design provisions (e.g., Caltrans Seismic Design Criteria, shear strength provisions in ACI 318-25, evaluation and retrofit provisions in ASCE 41-23)
d) Educators will have access to a rich resource for teaching seismic behavior of RC components.

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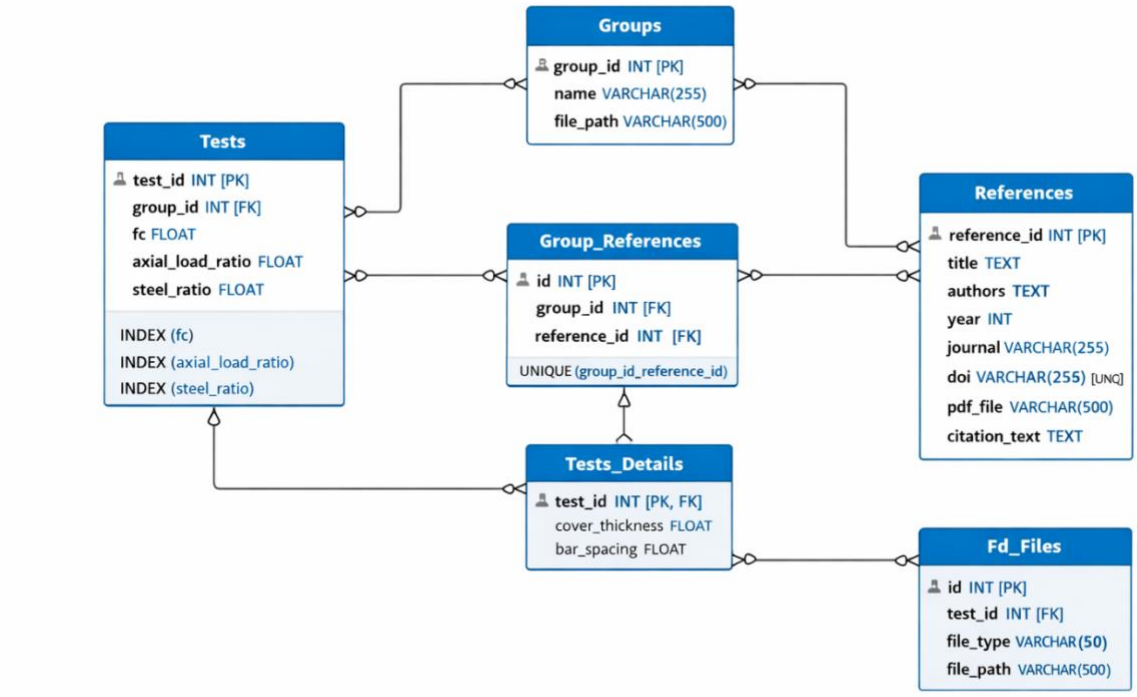
Ultimately, this work will create a sustainable, extensible, and authoritative database supporting the next generation of performance-based design and earthquake engineering practice.

Project Image

Preliminary Database Structure



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