

Concentrically Braced Frame (CBF) Group

Presented by Charles Roeder, Univ. of Washington

- Group strongly believed that the CBFs should be the focus of the US research program
- Focus was on establishing
 - priorities for CBF program
 - Japanese interaction with the US program
 - Payload or add-on projects
- Japanese engineering practice less interested in CBFs for buildings but interested in CBFs for other structures such as communication towers and very interested in specific portions of the CBF program

CBF Group

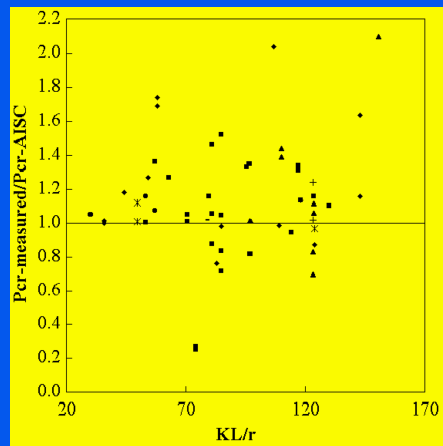
- Issues of concern
 - Buckling and post-buckling behavior of braces and columns
 - Behavior of buckling restrained braces (BRBs)
 - Column splices
 - Gusset plate connections
 - Base plates and foundation connections
 - Innovative devices (ie. dampers, self centering devices, etc)
 - System behavior
 - Test bed and theme structure

CBF Group

- Group unanimously agreed that focus of CBF work must be on system performance and improving the seismic performance and system reliability
 - 3D system verification test must be the centerpiece of work
 - Some disagreement about the role of this centerpiece
 - Some felt the 3D frame test should be designed so a portion of the frame was sacrificial but most of the frame was used many times
 - Most felt that this was unrealistic - It provides a distorted picture of system behavior and the tests were too expensive to provide the systematic
 - Most felt a systematic series of component and 2D tests were needed to address critical issues prior to 3D testing
 - Agreement that the component and 2D tests must provide appropriate boundaries to evaluate behavior

Priorities

- First Priority - Improvement of CBF system performance but several items must be addressed before this can be achieved. Of these items
 - First Priority - Gusset plate connections - need analytical and experimental studies to define, understand and model their behavior
 - Second Priority - Base plates and foundation connections - behavior not well understood and some problems noted. Should build on current AISC work
 - Third Priority - Brace buckling and post buckling behavior - Many tests have been performed but models for predicting full range of behavior are not adequate. Possibly this could build heavily on existing test data.
- Research on these 3 areas must consider realistic boundaries and may require 2D subassemblages.



Payload and Add-on Projects

- Column Splices - This issue is felt to be under control in current design since fully welded splice connections with matching electrodes and electrodes with minimum toughness are required.
 - Possibly more economical solutions could be developed
 - Evaluation of retrofit of existing structures are appropriate
 - Thus, important issue but lower priority than others
- BRB Behavior - BRB behavior is generally very good, but their performance in systems with gusset plates and framing elements may not be adequate - payload or add-on to gusset plate and system issues
- Innovative Dampers - Possibly this should be coupled to BRB. Secondary issue to priority items.

Japanese Researcher Interaction

- Researchers interested in analysis of braced frames and buckling behavior
- Japanese practice interested in CBF for applications other than buildings - communication towers
- Plan to do Gusset Plate connection research and want to directly cooperate in this area.
- Japanese researchers may use a BRB for their test platform. By Japanese practice this surrounding frame may have little damage at the end of testing. Possible interaction may include building in CBF bracing to this test frame for final test. The CBF frame could be tested to all levels including destruction.