RC Column Cyclic Tests

Fu-Pei, Hsiao, Wen-Cheng, Shen,
Pu-Wen, Weng, Yi-An, Li

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Outlines

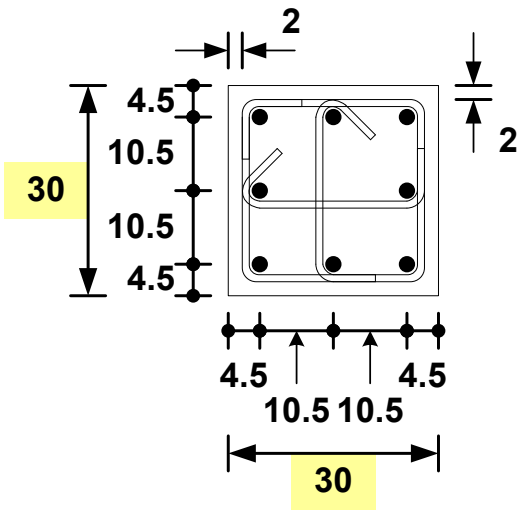
- Specimen Design
- Construction
- Test Setup
- Instrumentation Scheme
  - Interior
  - Exterior
- Material Property
- Test Result

Specimen Design

Cross Section of Members

$$\rho_s = 2.53\%$$

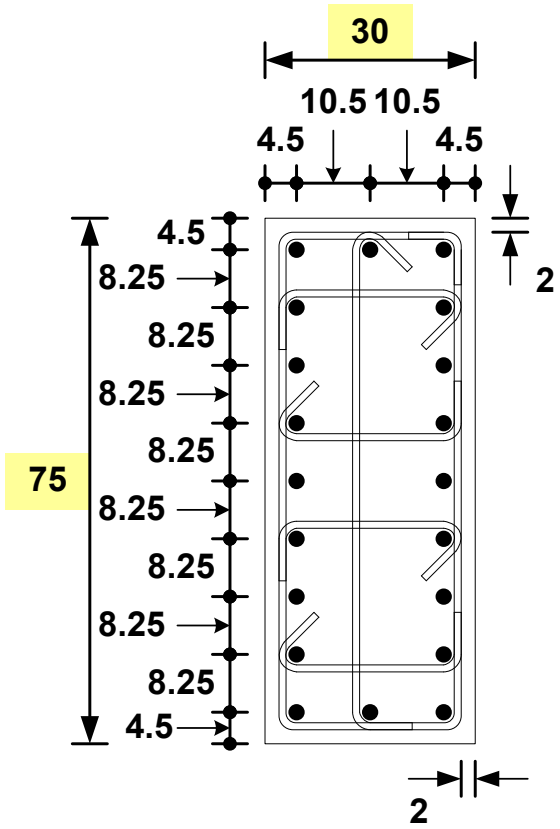
Column A



Longitudinal Rebar: 8-D19
Stirrups: D10@12 *cm*
Crossties: D10@24 *cm*

Stirrups: 90° Hook, Staggered
Crossties: 135° and 90° Hooks, Staggered
Cover: 2 *cm*

Column B

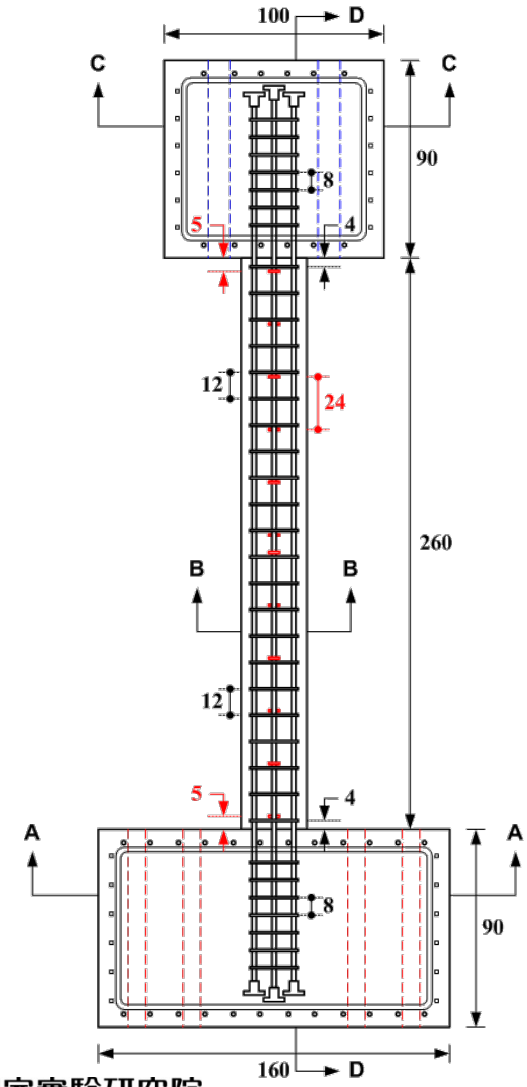


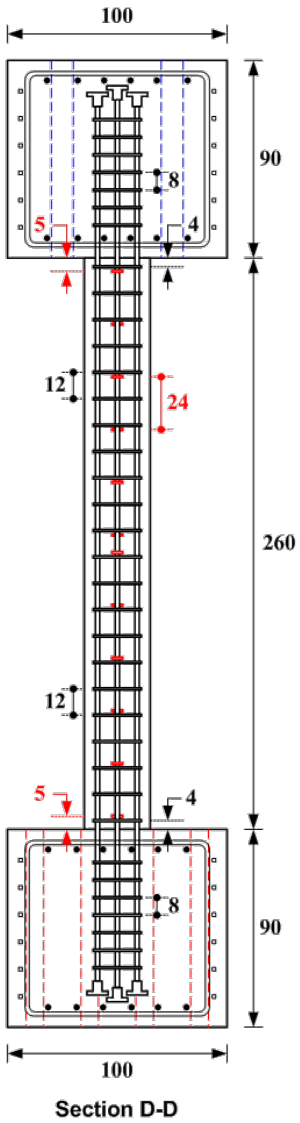
Longitudinal Rebar: 20-D19
Stirrups: D10@12 *cm*
Crossties: D10@24 *cm*

Stirrups: 90° Hook, Staggered
Crossties: 135° and 90° Hooks, Staggered
Cover: 2 *cm*

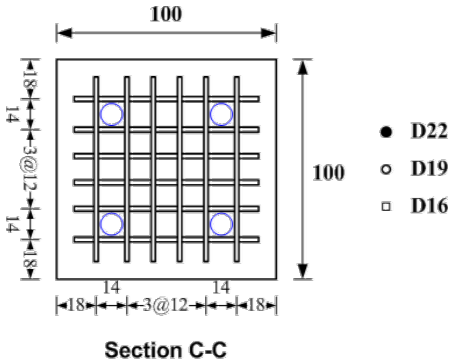
Column A (30×30)

Aspect Ratio ≈ 8.66

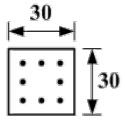




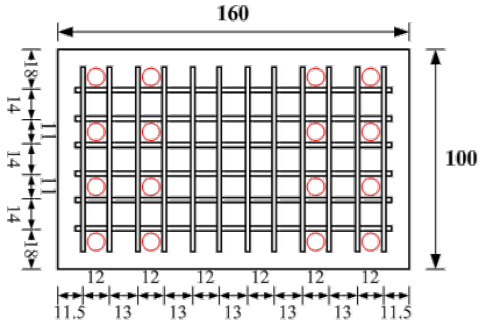
Section D-D



Section C-C



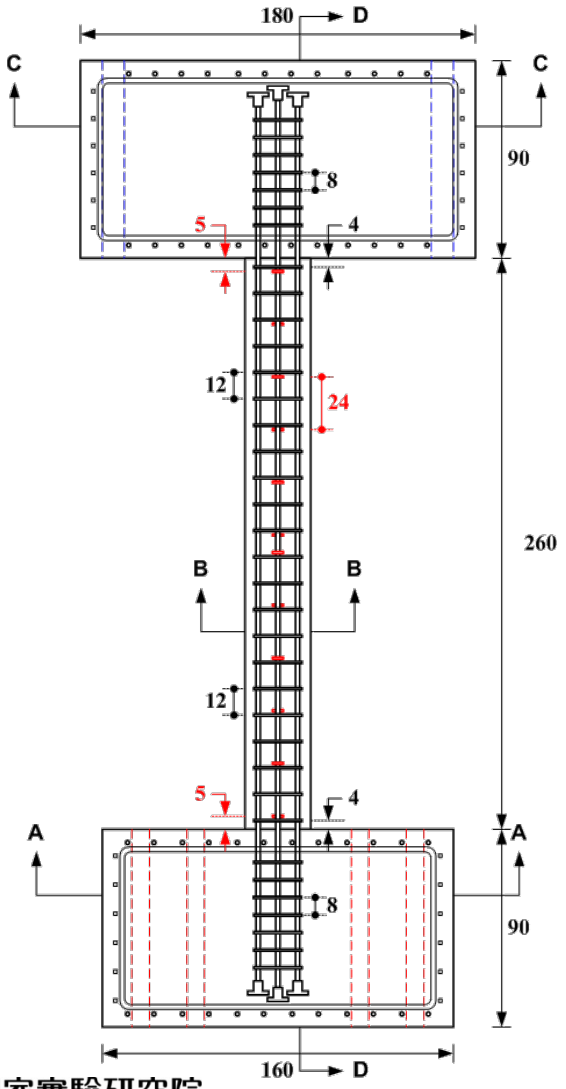
Section B-B

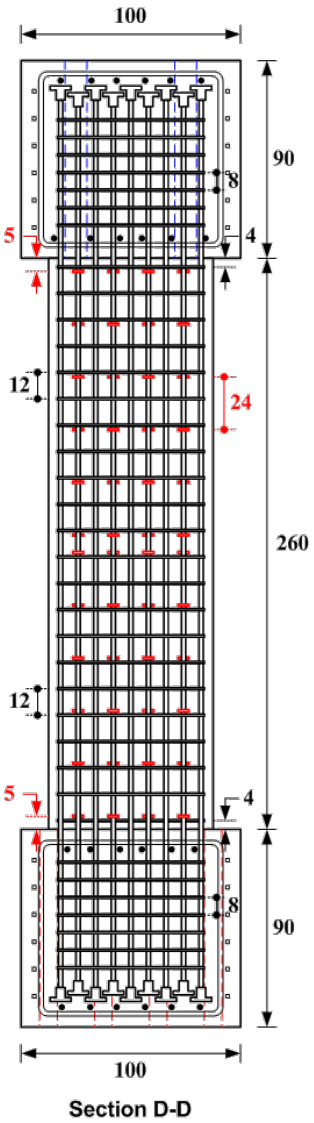


Section A-A

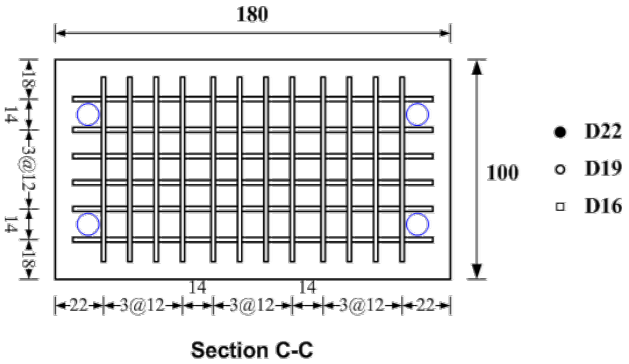
Column B (30×75)

Aspect Ratio ≈ 8.66

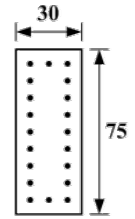




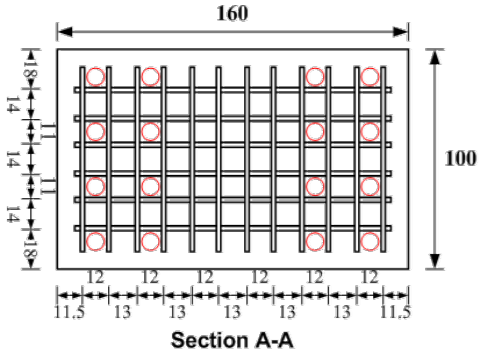
Section D-D



Section C-C



Section B-B



Section A-A

Specimen Construction

Specimen Construction

Rebar Installation Completed

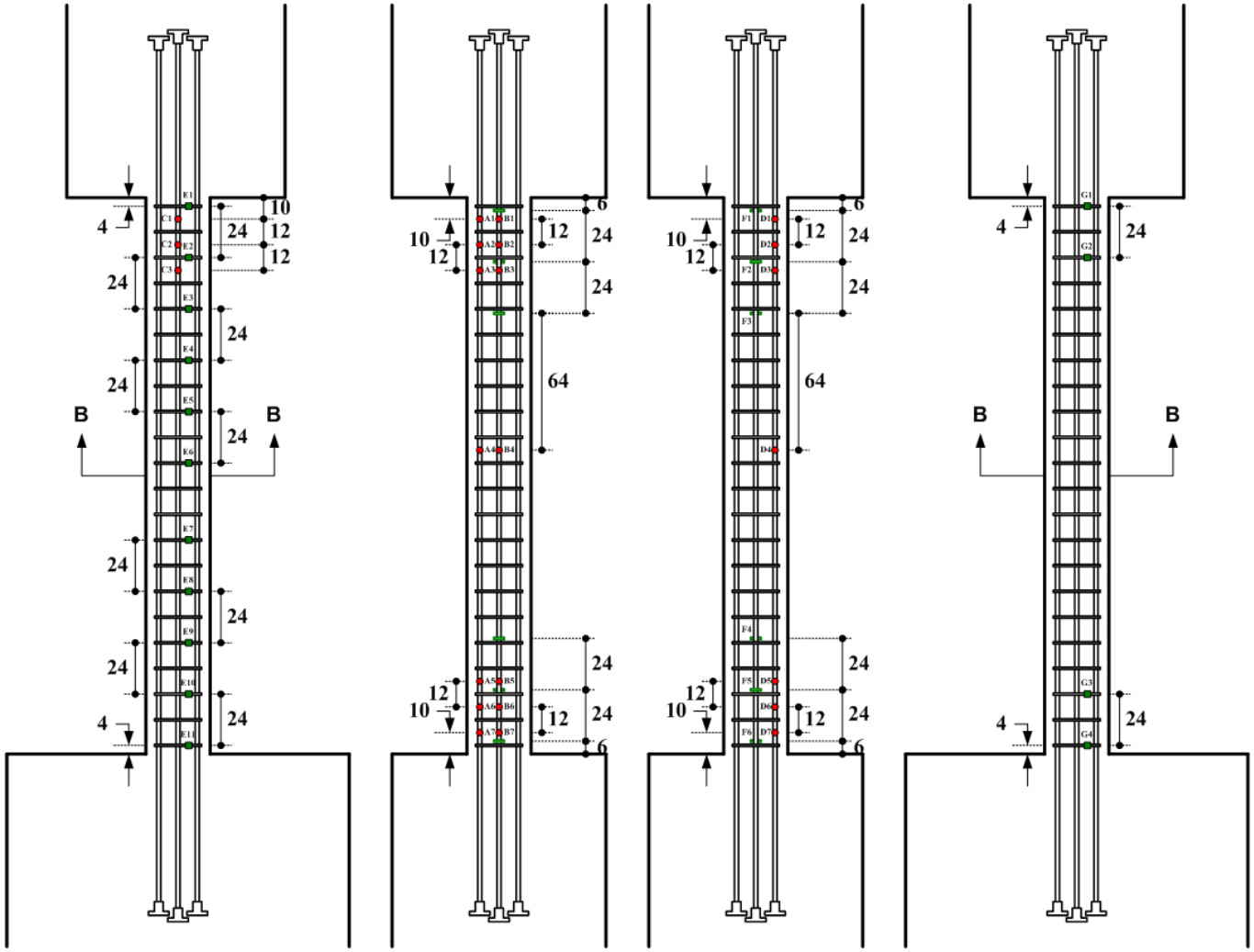
Formwork Assembly Completed

Construction Completed

Instrumentation Scheme

- Interior
- Exterior

Column A (30×30)



Front View

Strain Gage C, E

Right Side View

Stain Gage A, B, F

Left Side View

Stain Gage D, F

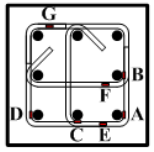
Back View

Strain Gage G

Total 45

Longitudinal: 24

Hoop: 21



Section B-B

Loading Direction

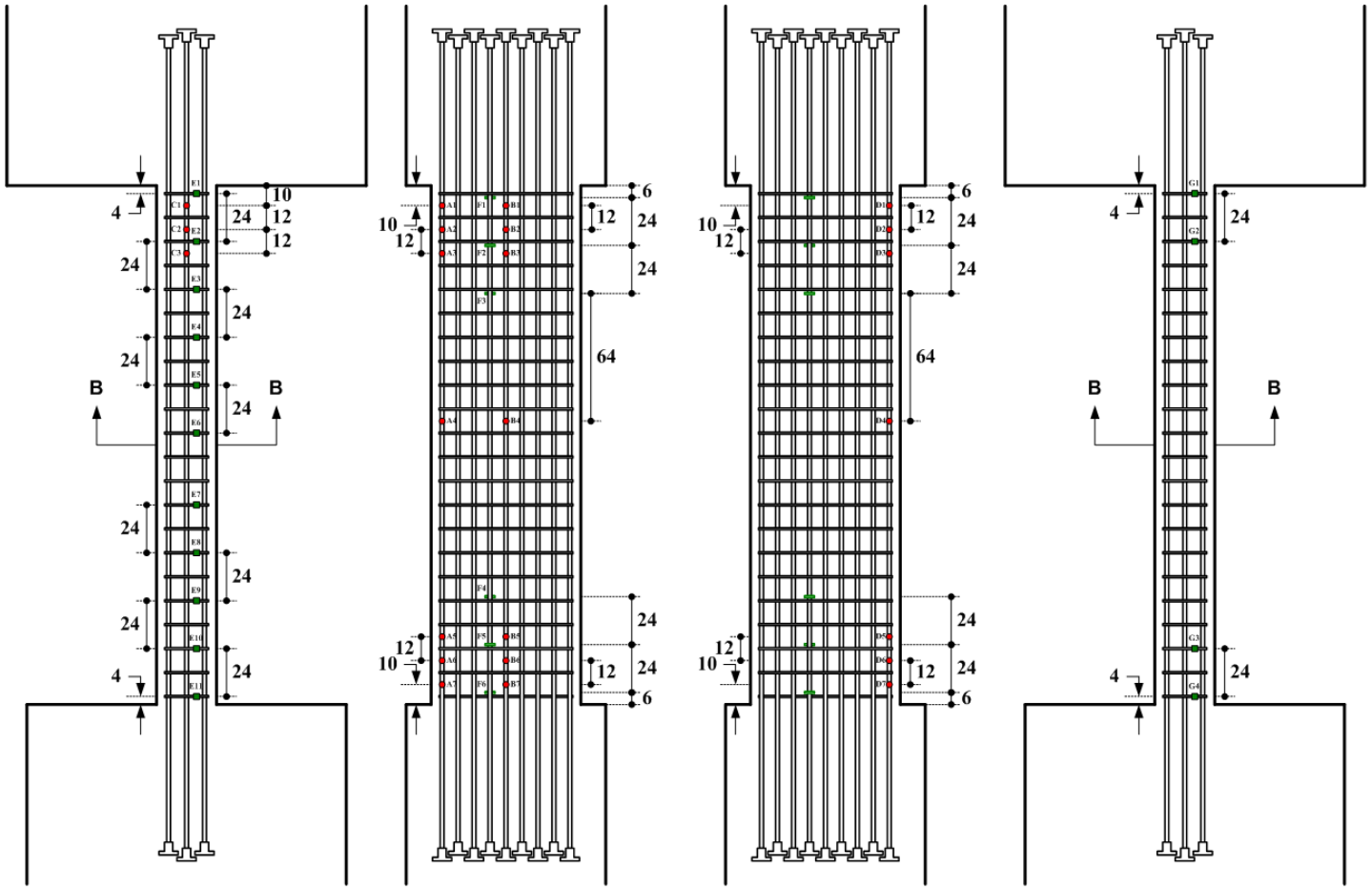
Longitudinal
Stain Gage A: 7
Stain Gage B: 7
Stain Gage C: 3
Stain Gage D: 7

Total 45

Hoop
Stain Gage E: 11
Stain Gage G: 4

Tie
Stain Gage F: 6

Column B (30×75)



Front View

Strain Gage C, E

Right Side View

Stain Gage A, B, F

Left Side View

Stain Gage D, F

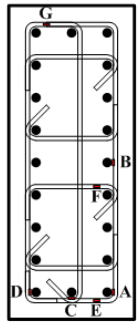
Back View

Strain Gage G

Total 45

Longitudinal: 24

Hoop: 21



Section B-B

Loading Direction

Longitudinal
Stain Gage A: 7
Stain Gage B: 7
Stain Gage C: 3
Stain Gage D: 7

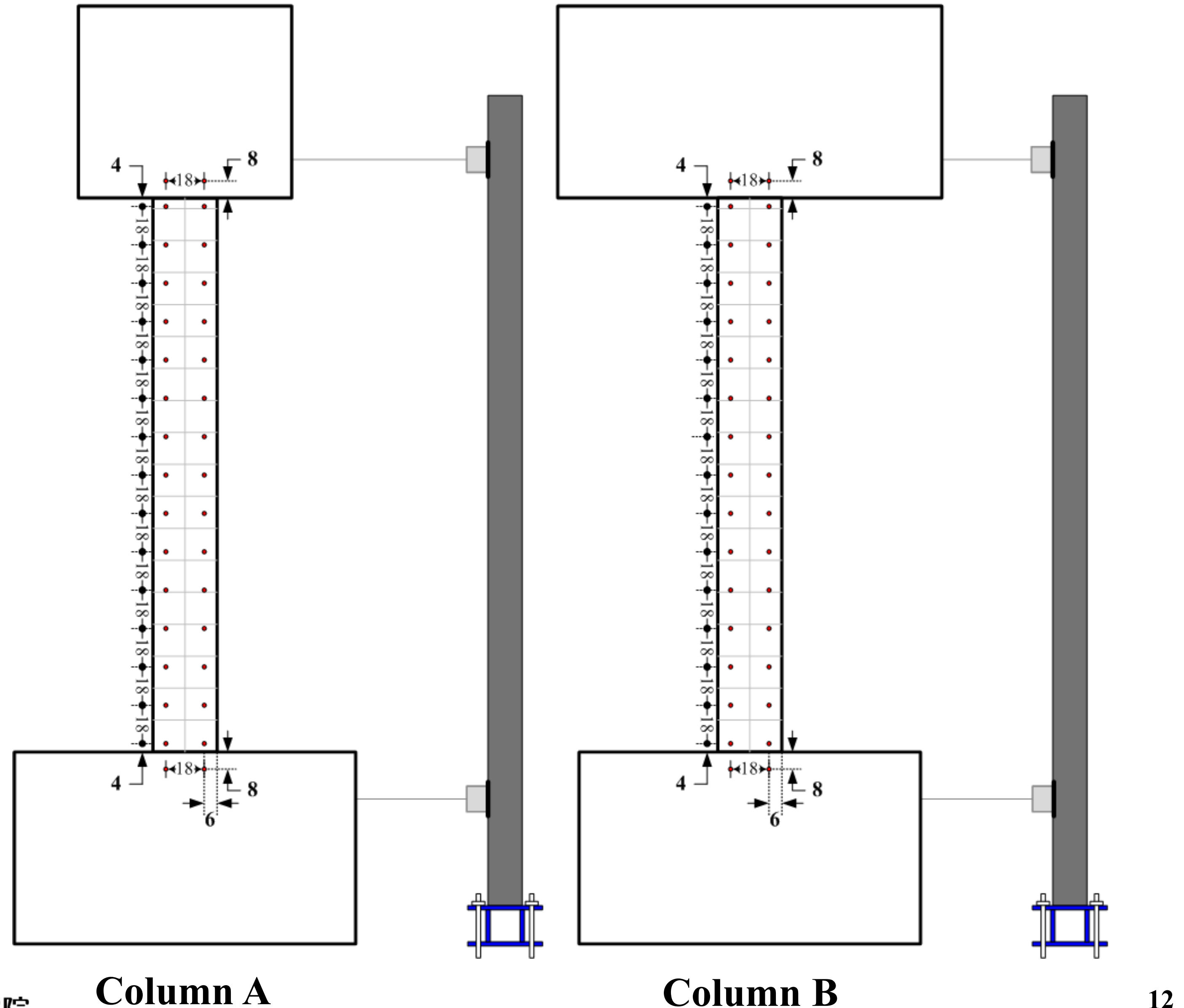
Total 45

Hoop
Stain Gage E: 11
Stain Gage G: 4

Tie
Stain Gage F: 6

Exterior Instrument

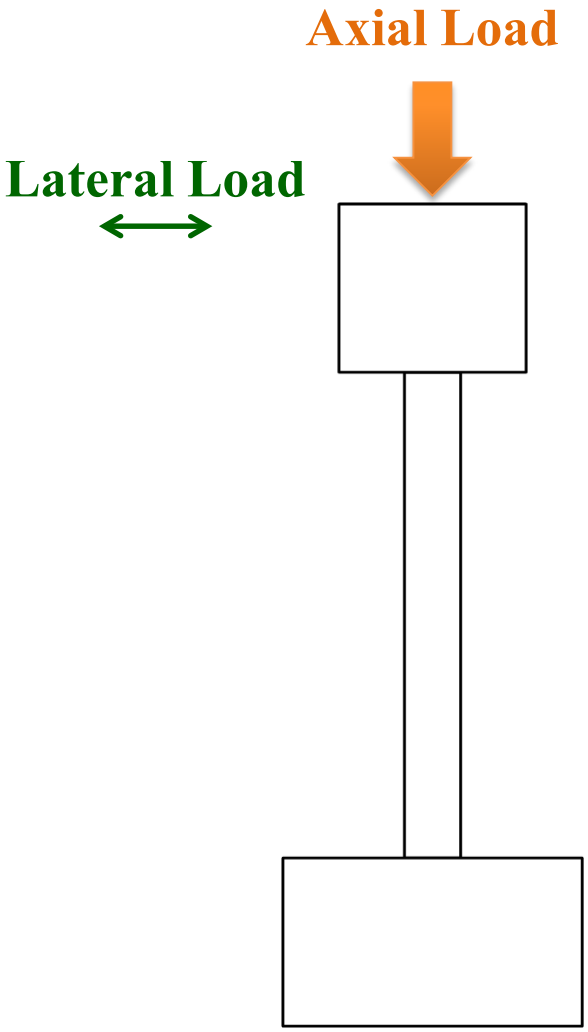
Loading Direction



NDI Marker

Test Setup

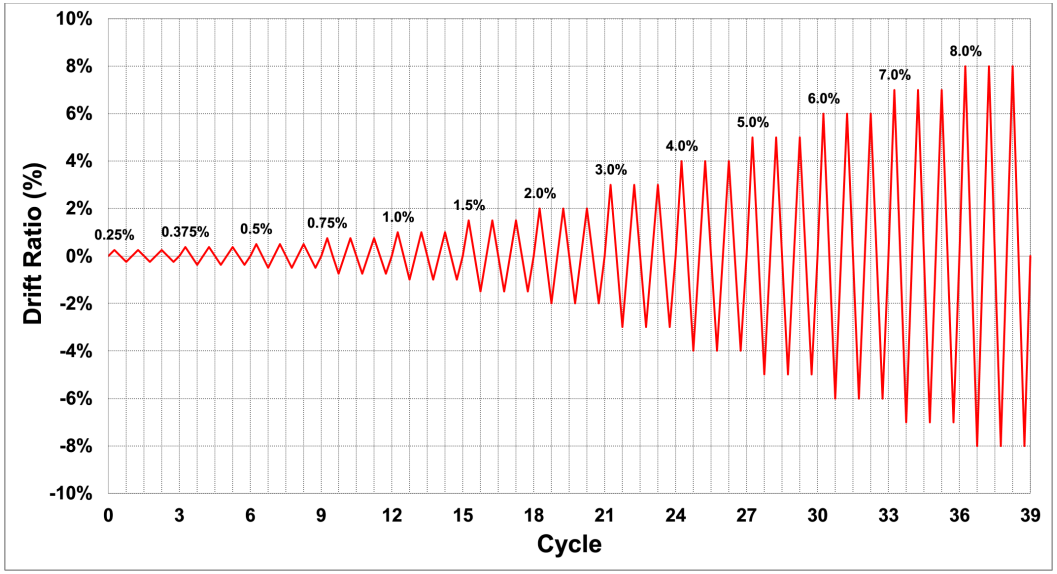
Loading Protocol



Column A $P \approx 0.12 A_g f'_c$

Column B $P \approx 0.06 A_g f'_c$

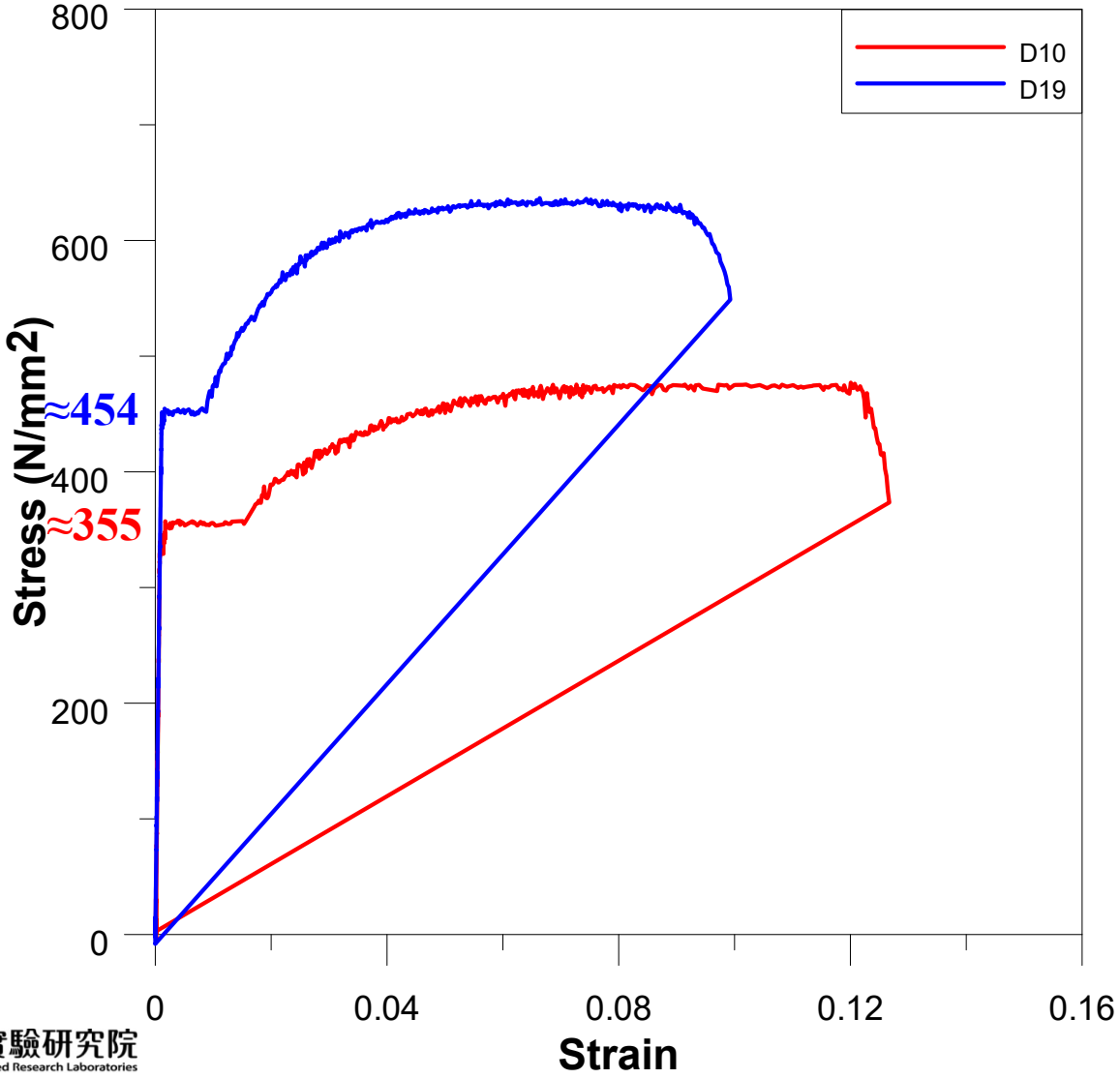
Cyclic test in constant axial load P



Material Property

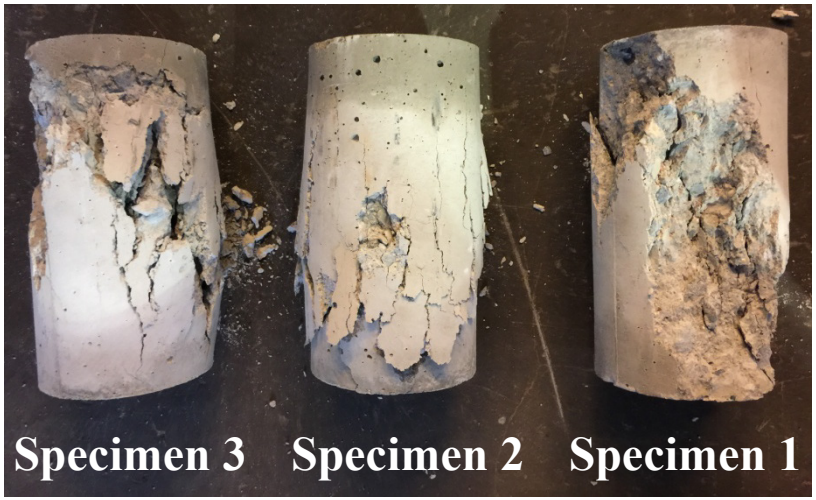
Yield Strength of Steel

- **D10 vs. D19**



Compression Strength of Concrete

28 Days	f'_c (*kgf/cm²*)
Specimen 1	210.16
Specimen 2	220.84
Specimen 3	227.83
Average	219.61

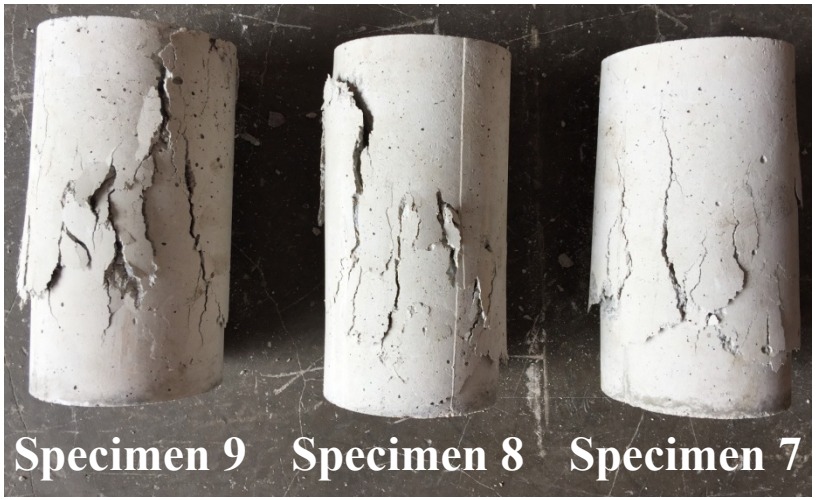


Compression Strength of Concrete

32 Days	f'_c (*kgf/cm²*)
Specimen 4	222.88
Specimen 5	240.70
Specimen 6	246.21
Average	236.60

Compression Strength of Concrete

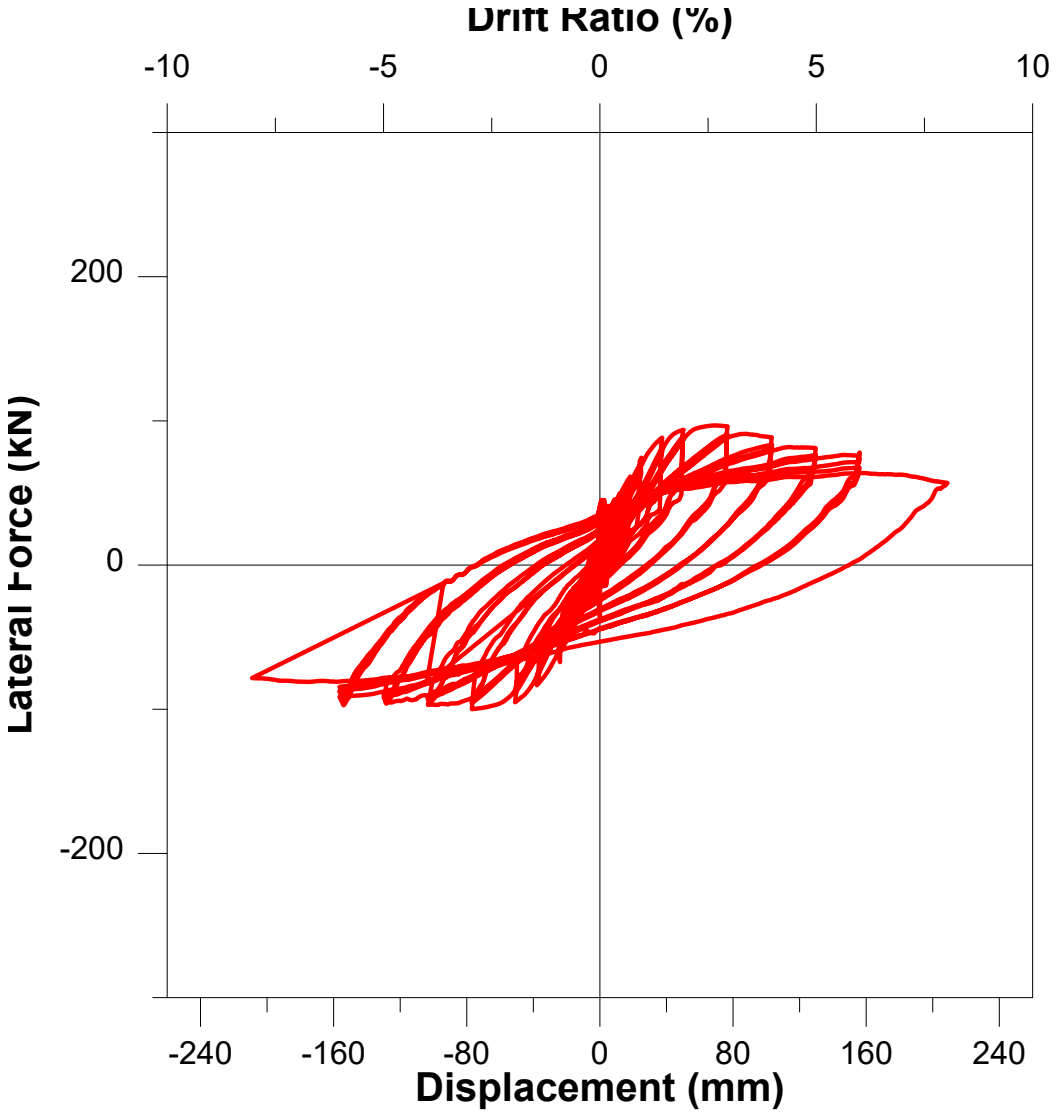
35 Days	f_c' (*kgf/cm²*)
Specimen 7	239.43
Specimen 8	227.41
Specimen 9	238.77
Average	235.20



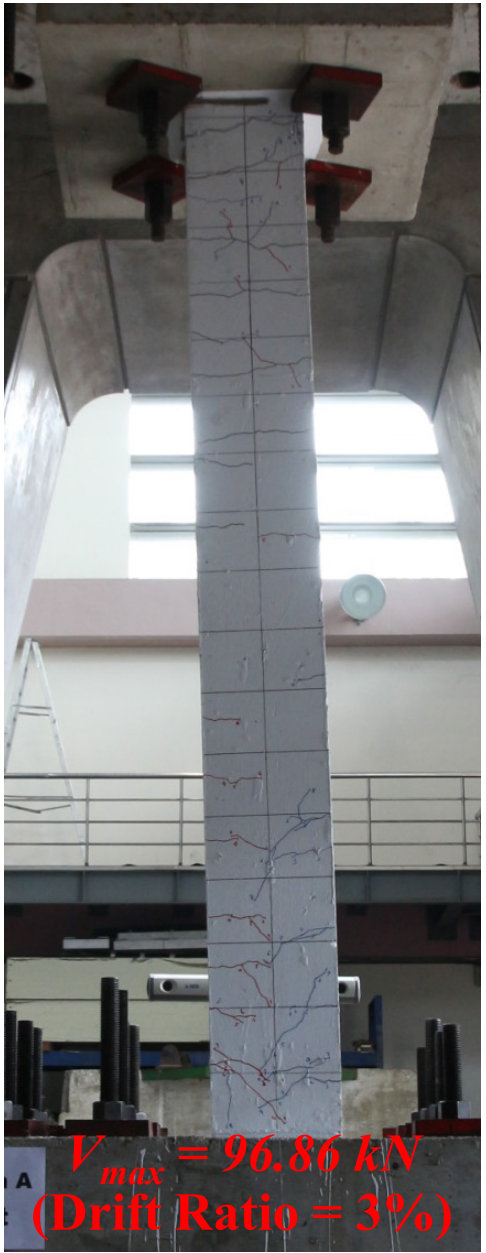
Test Results

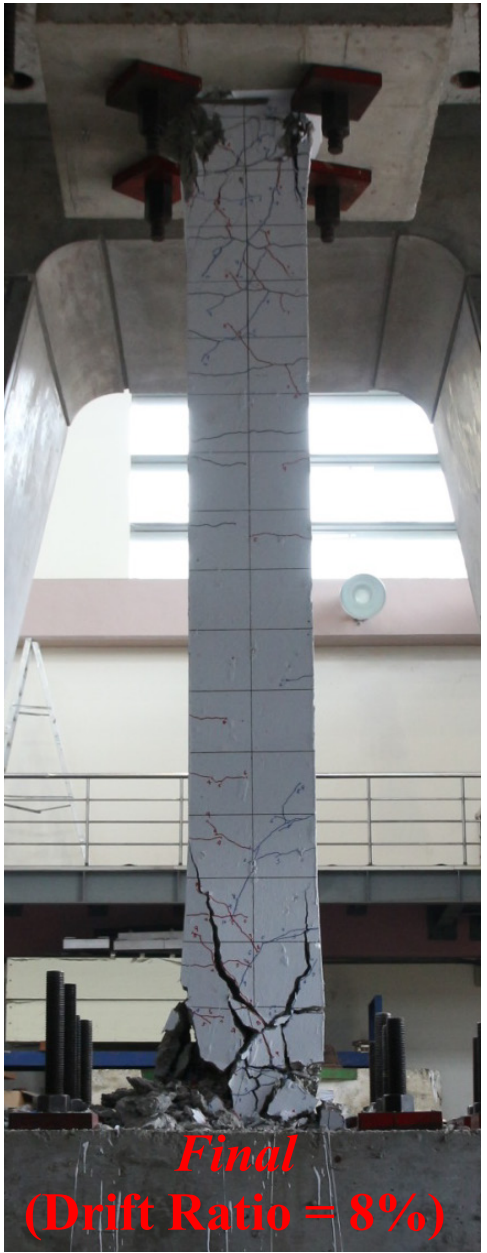
- Column A
- Column B

Hysteretic Loop (Column A)

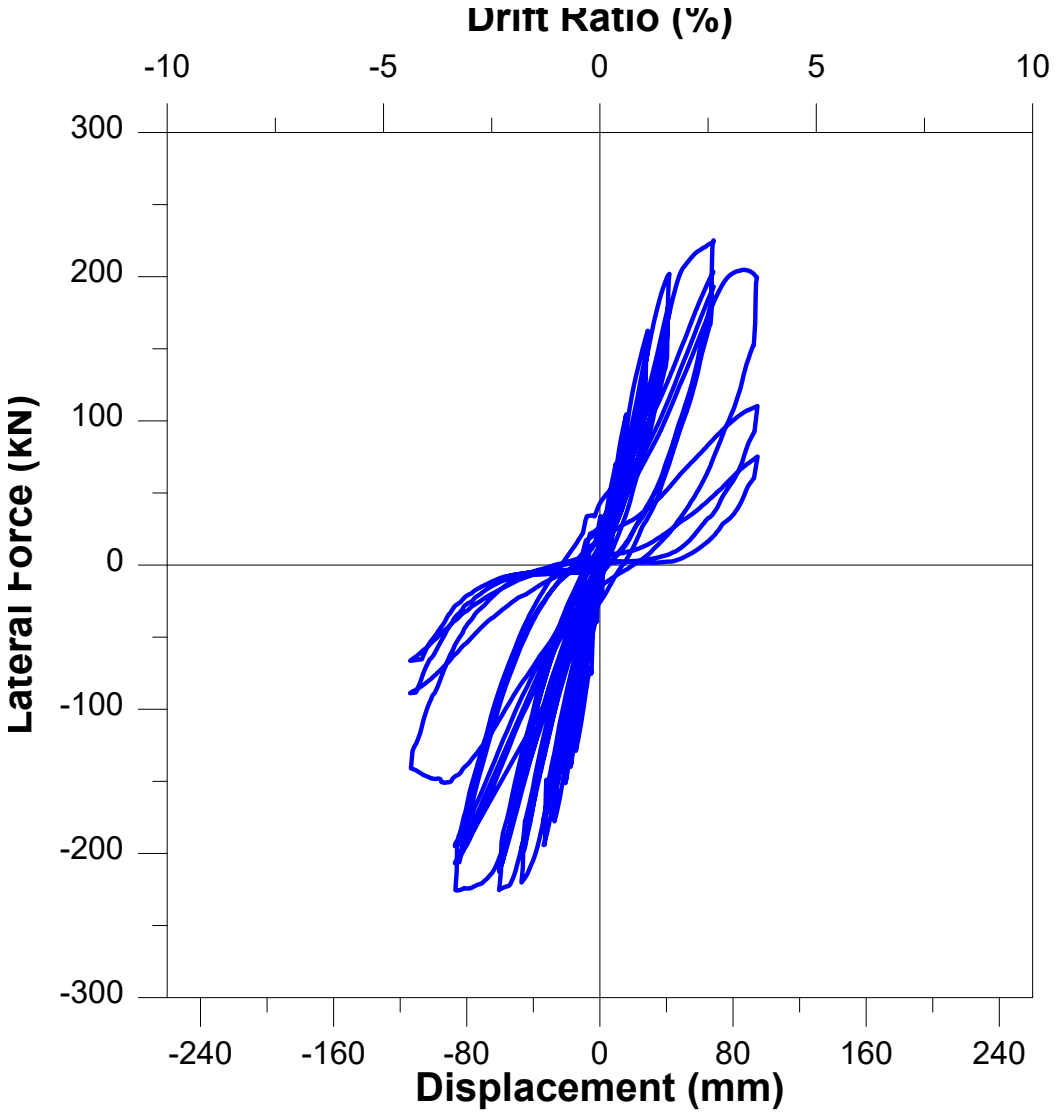


Crack Pattern (Column A)





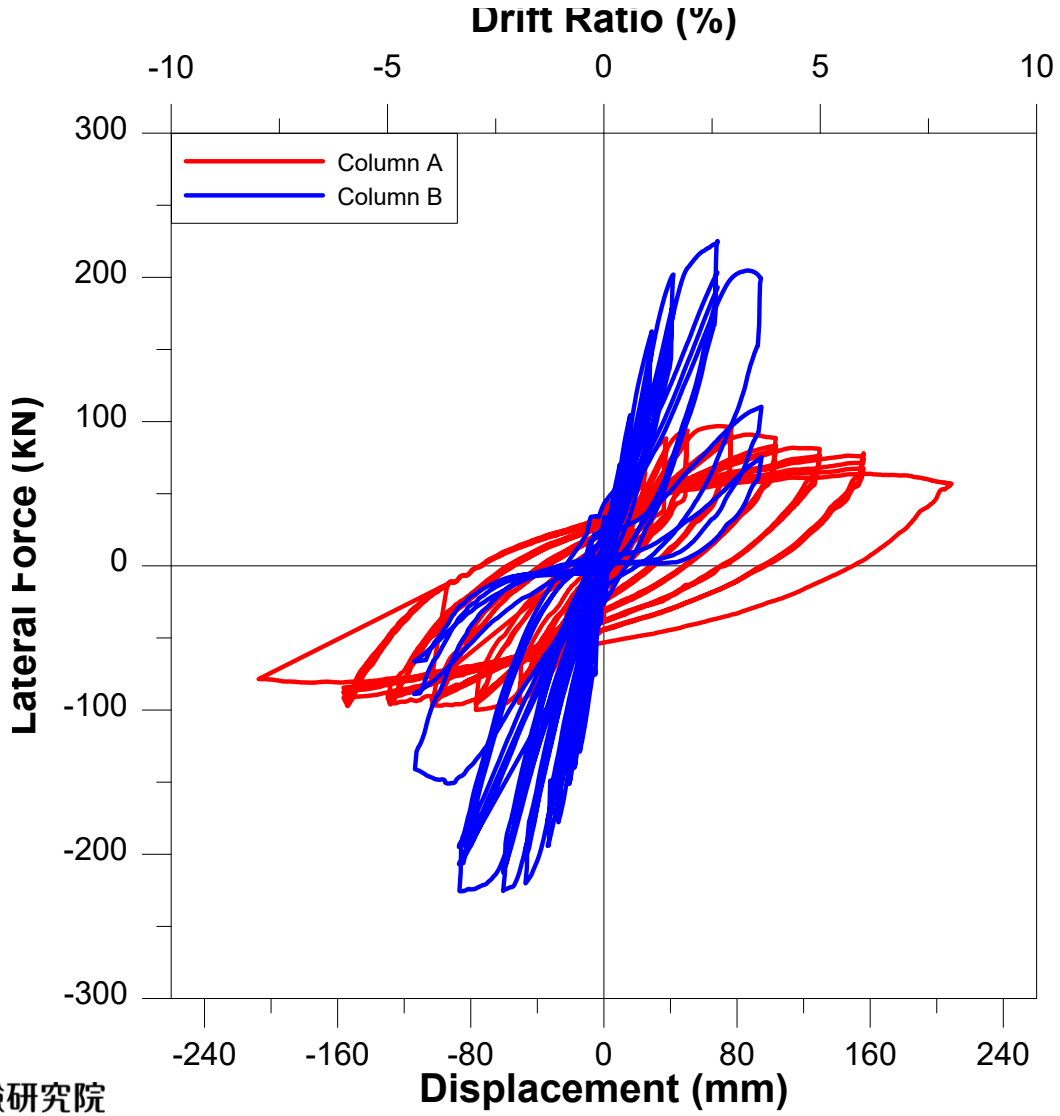
Hysteretic Loop (Column B)



Crack Pattern (Column B)

Hysteretic Loop

- **Column A vs. Column B**



Thanks for your kind attentions