

鋼筋混凝土構架結構 倒塌實驗之單柱行為測試

蕭輔沛、沈文成
翁樸文、李翼安

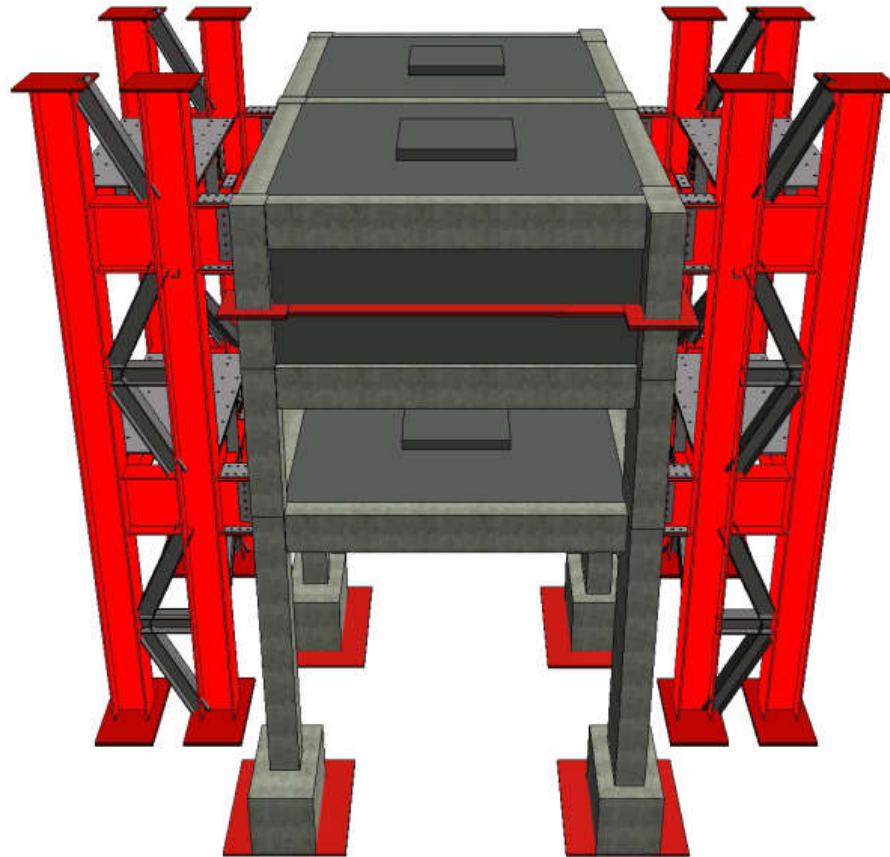
July 16, 2018

簡報大綱

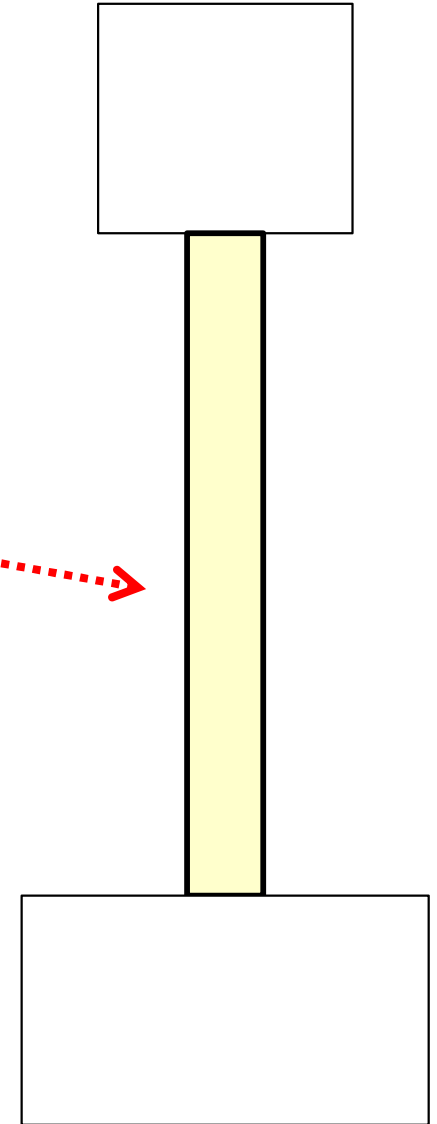
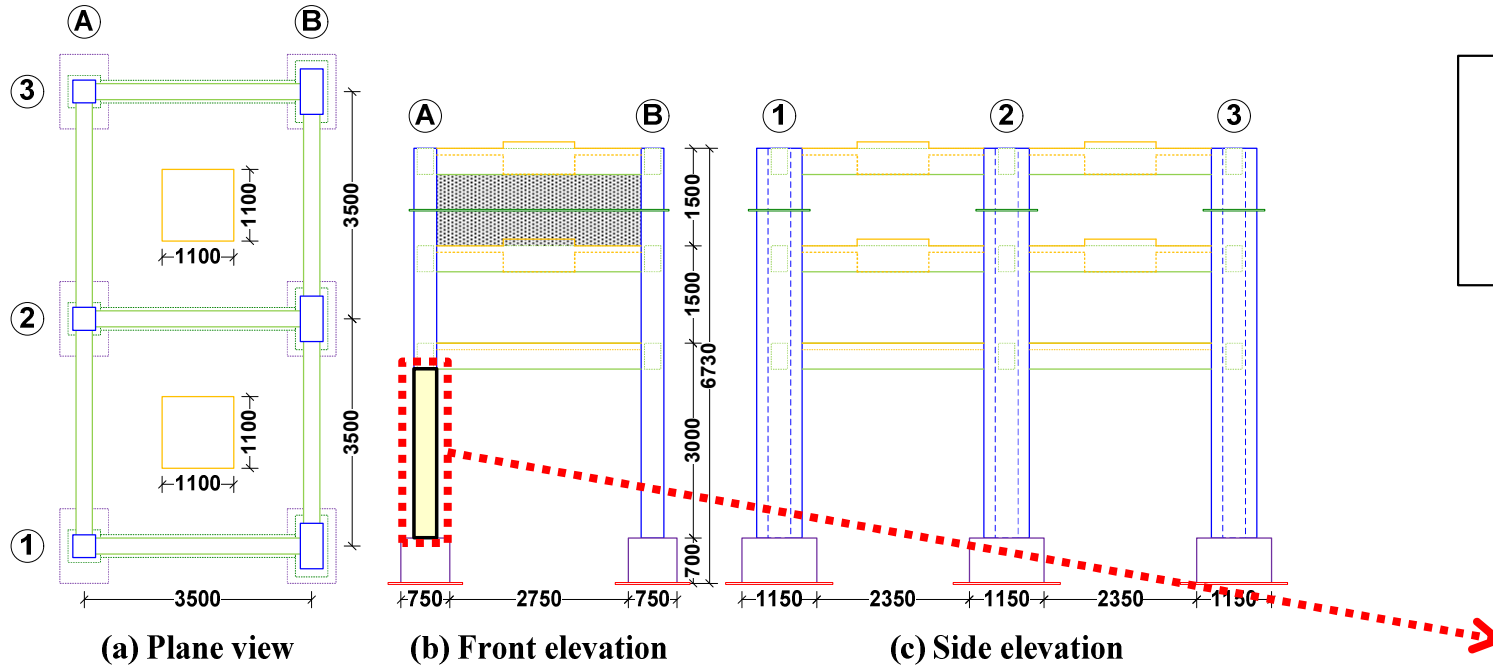
- 設計規劃
- 量測規劃
- 測試佈置
- 材料強度
- 測試結果

設計規劃

開幕展示實驗試體模擬圖

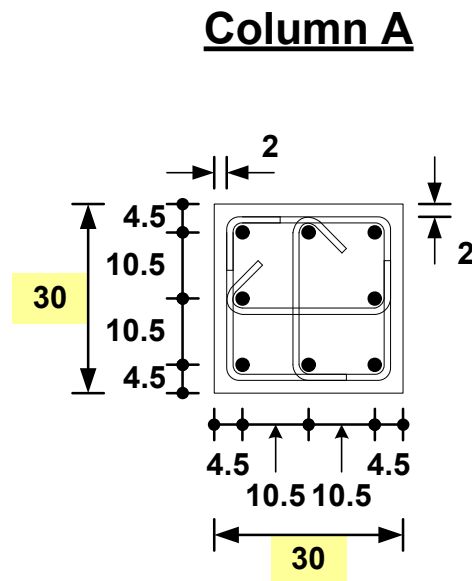


單柱試體範圍



柱斷面、配筋細節

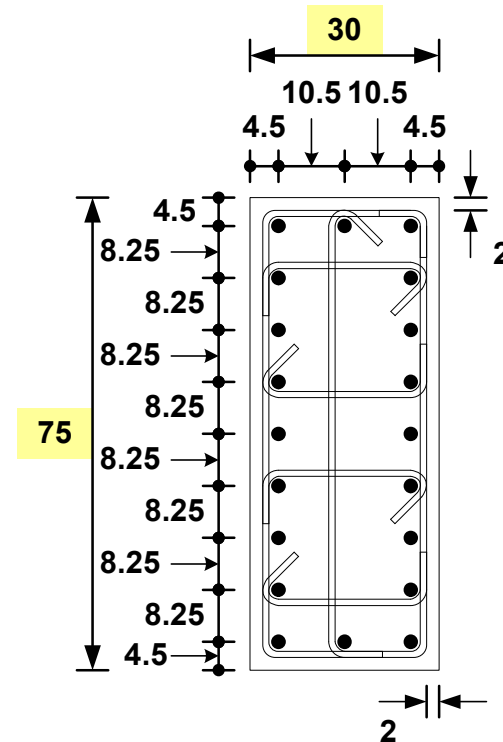
$$\rho_l = 2.53\%$$



縱向主筋 (SD420W) : 8-D19
閉合箍筋 (SD280W) : D10@12 cm
繫筋 (SD280W) : D10@24 cm

閉合箍筋採 90° 彎鉤，交錯配置
繫筋採 135° 及 90° 彎鉤，交錯配置
淨保護層 2 cm

Column B

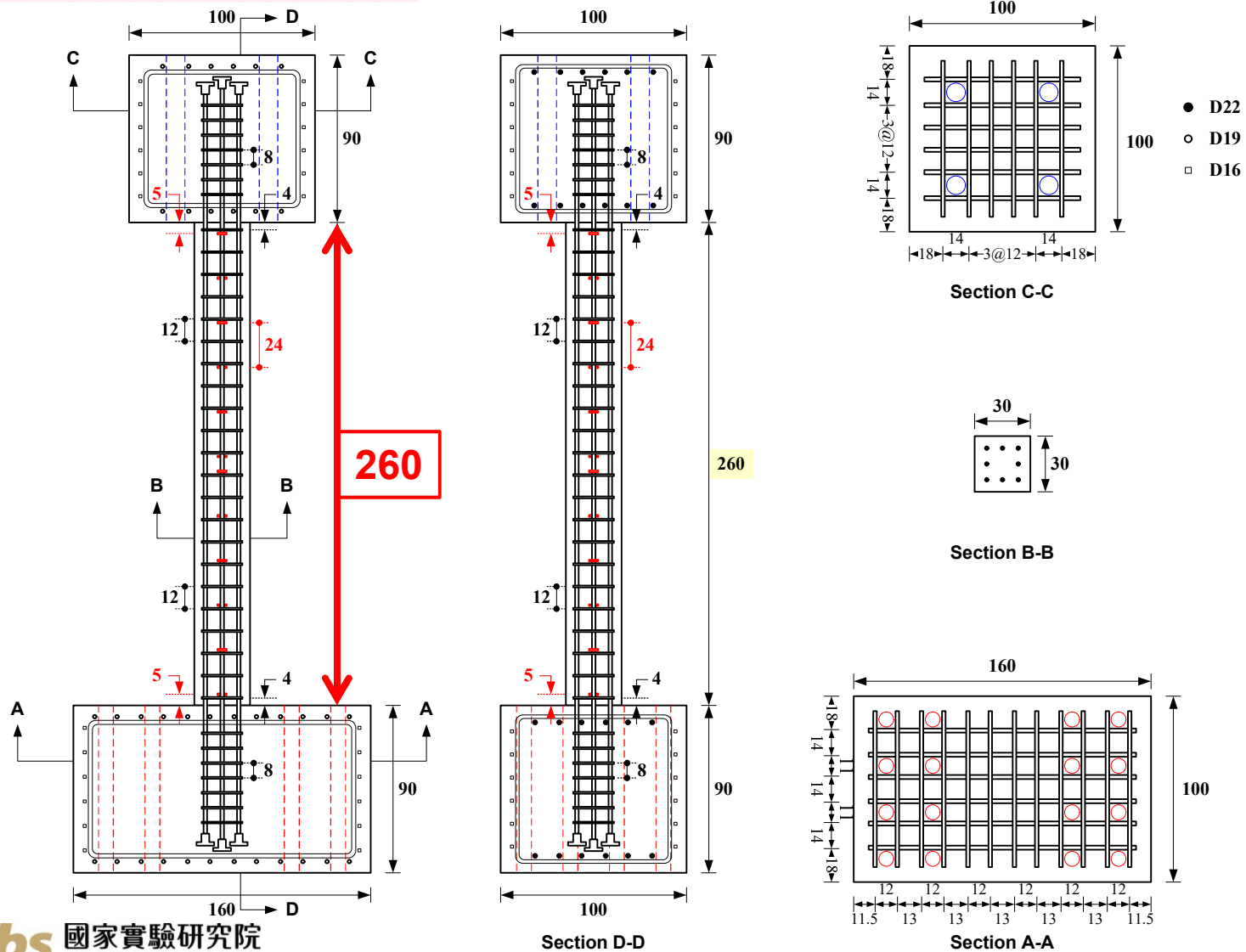


縱向主筋 (SD420W) : 20-D19
閉合箍筋 (SD280W) : D10@12 cm
繫筋 (SD280W) : D10@24 cm

閉合箍筋採 90° 彎鉤，交錯配置
繫筋採 135° 及 90° 彎鉤，交錯配置
淨保護層 2 cm

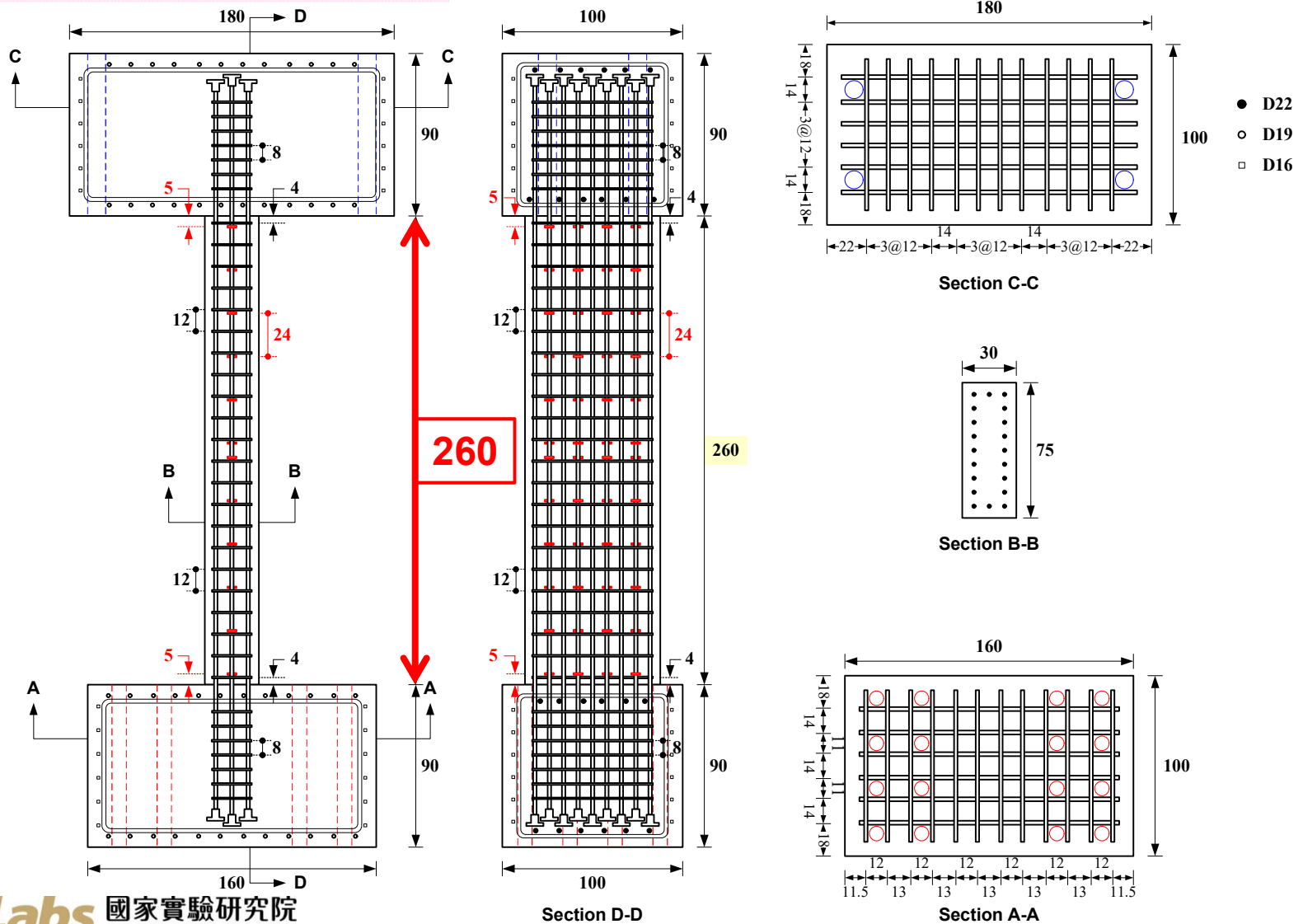
平、立面圖 (Column A)

Aspect Ratio ≈ 8.67



平、立面圖 (Column B)

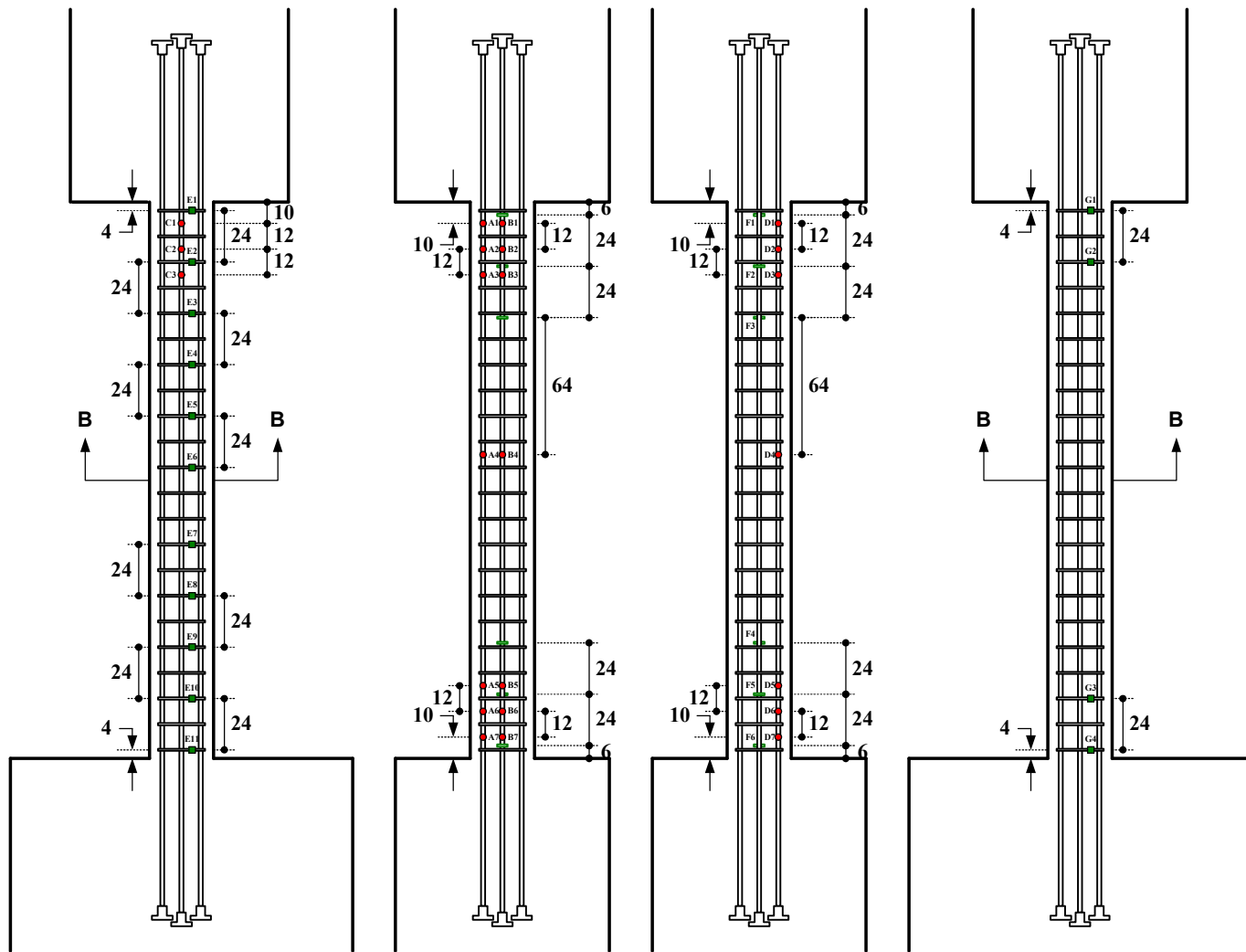
Aspect Ratio ≈ 8.67



量測規劃

- 內部量測
- 外部量測

應變計佈設 (Column A)



Front View

Right Side View

Left Side View

Back View

Strain Gage C, E

Strain Gage A, B, F

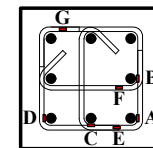
Strain Gage D, F

Strain Gage G

Total 45

Longitudinal: 24

Hoop: 21



Section B-B



Loading Direction

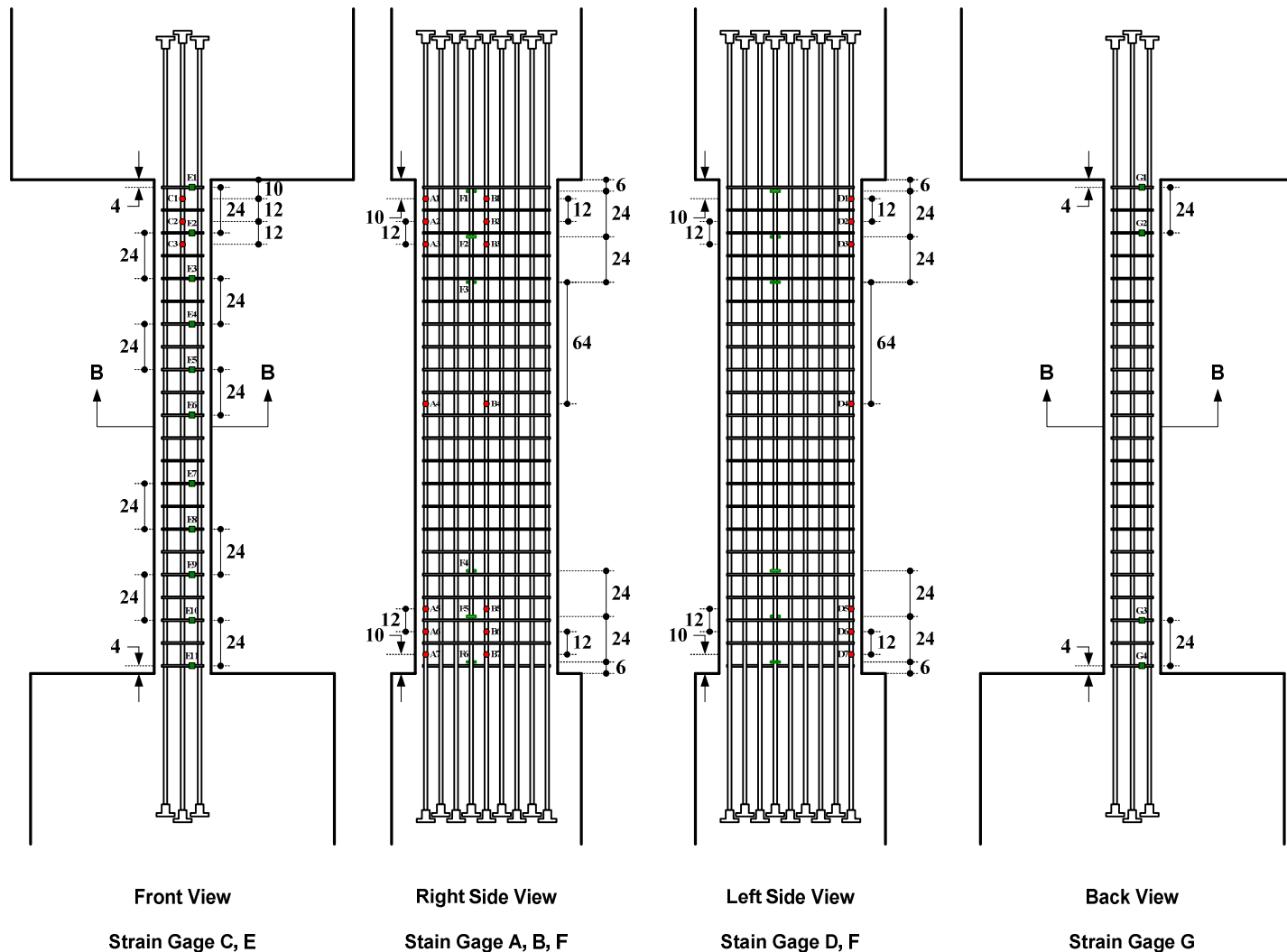
Longitudinal
Stain Gage A: 7
Stain Gage B: 7
Stain Gage C: 3
Stain Gage D: 7

Hoop
Stain Gage E: 11
Stain Gage G: 4

Tie
Stain Gage F: 6

Total 45

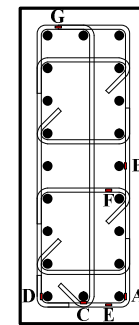
應變計佈設 (Column B)



Total 45

Longitudinal: 24

Hoop: 21



Section B-B

Loading Direction

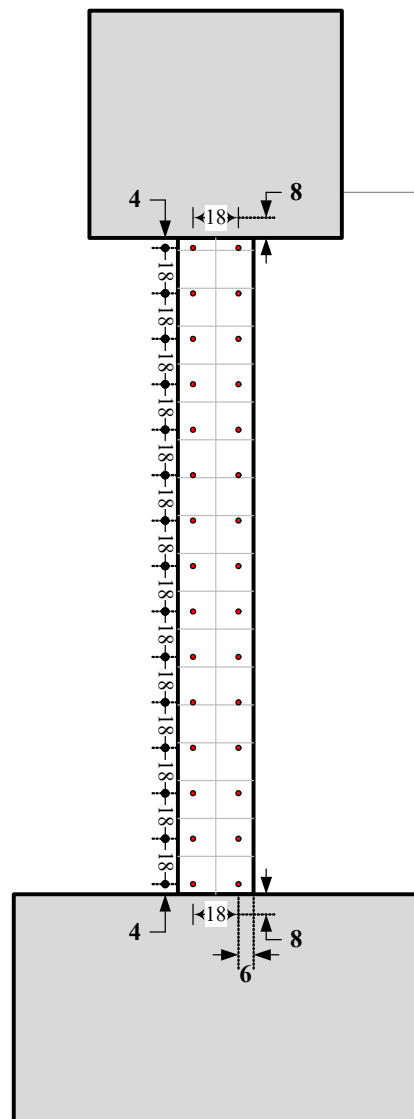
Longitudinal	Hoop
Stain Gauge A: 7	Stain Gauge E: 11
Stain Gauge B: 7	Stain Gauge G: 4
Stain Gauge C: 3	Tie
Stain Gauge D: 7	Stain Gauge F: 6
Total 45	

外部量測規劃

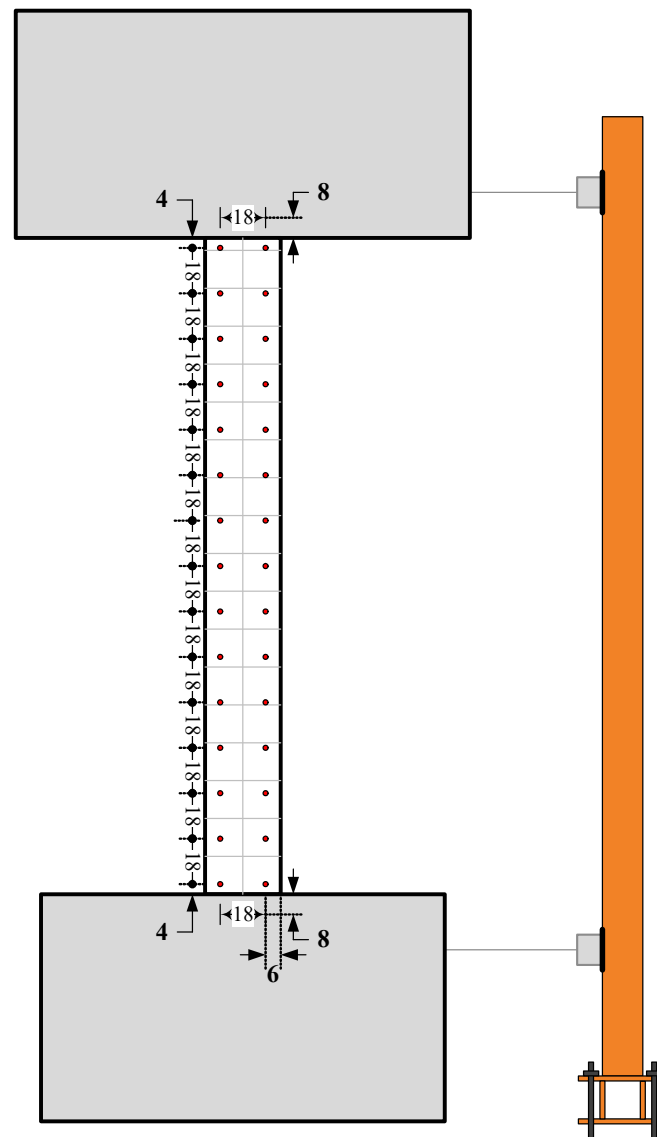
側力施加方向



● 影像量測佈設點



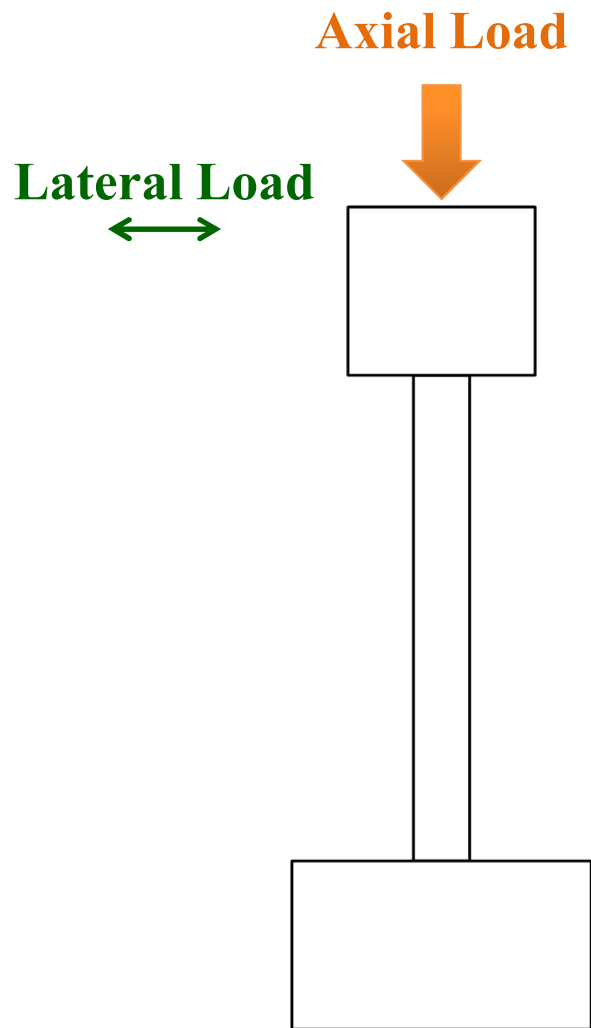
Column A



Column B

測試佈置

側力加載歷時



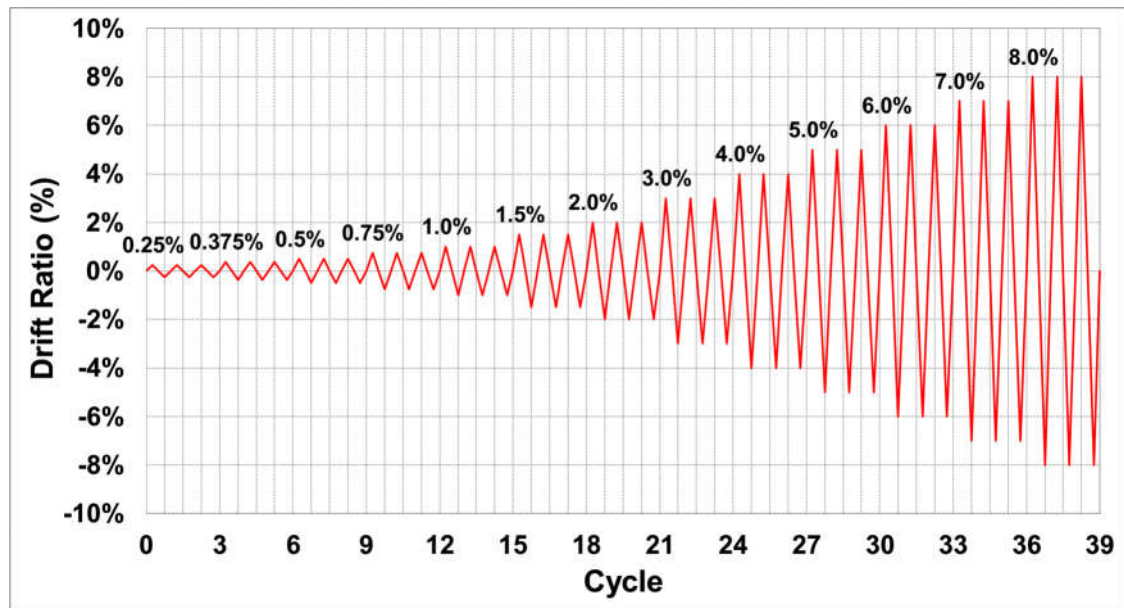
Column A

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

Column B

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

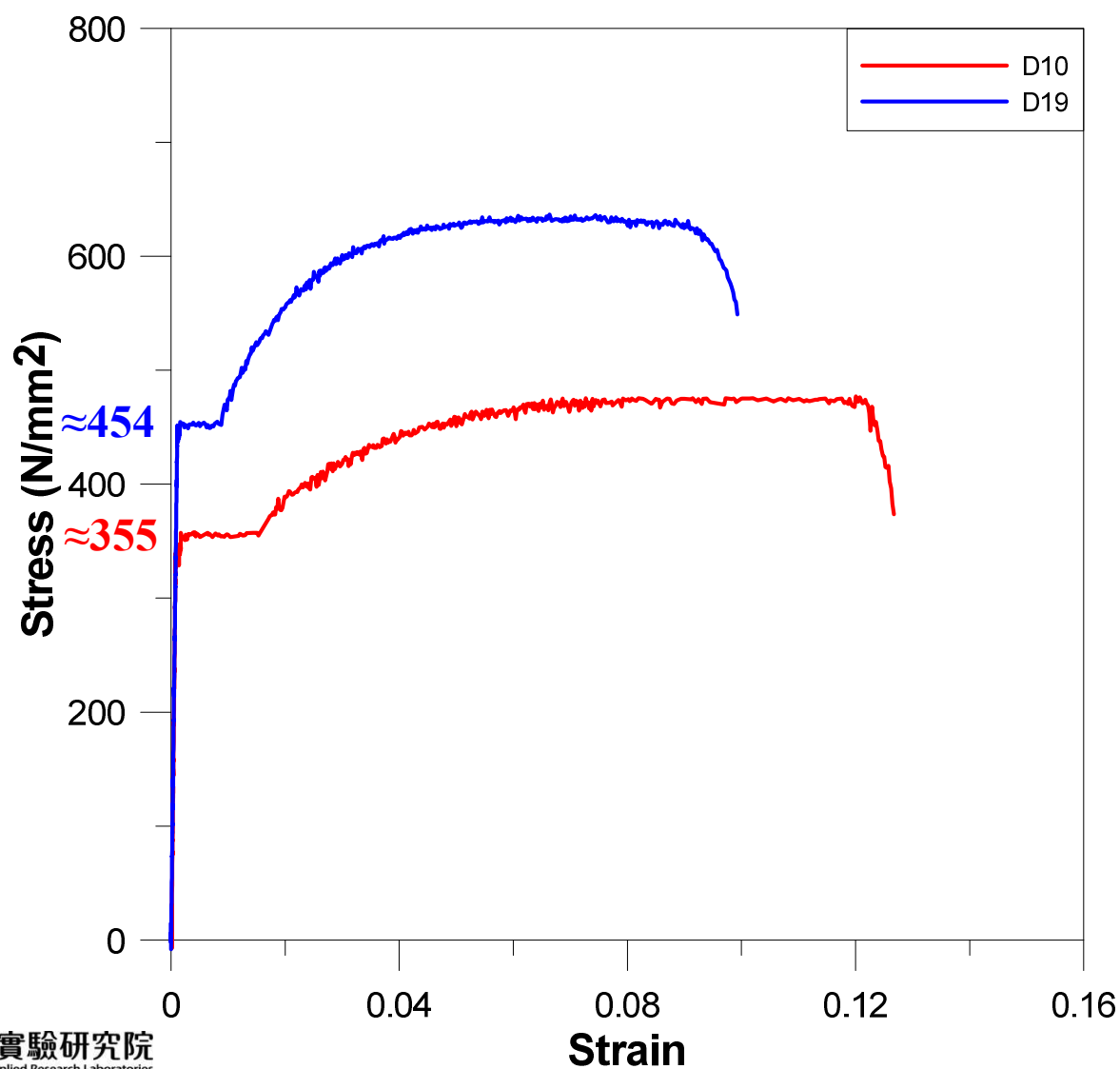
固定軸力下進行反覆載重試驗
每一個層間變位角執行三個迴圈加載



材料強度

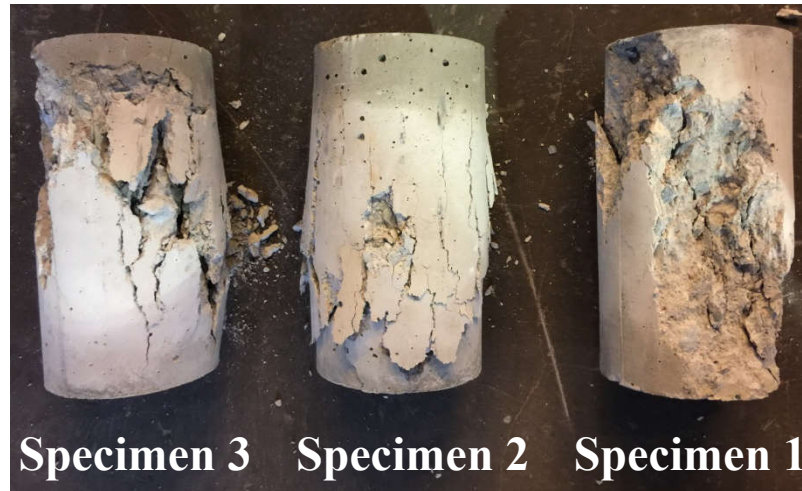
鋼筋抗拉強度

- **D10** vs. **D19**



混凝土抗壓強度

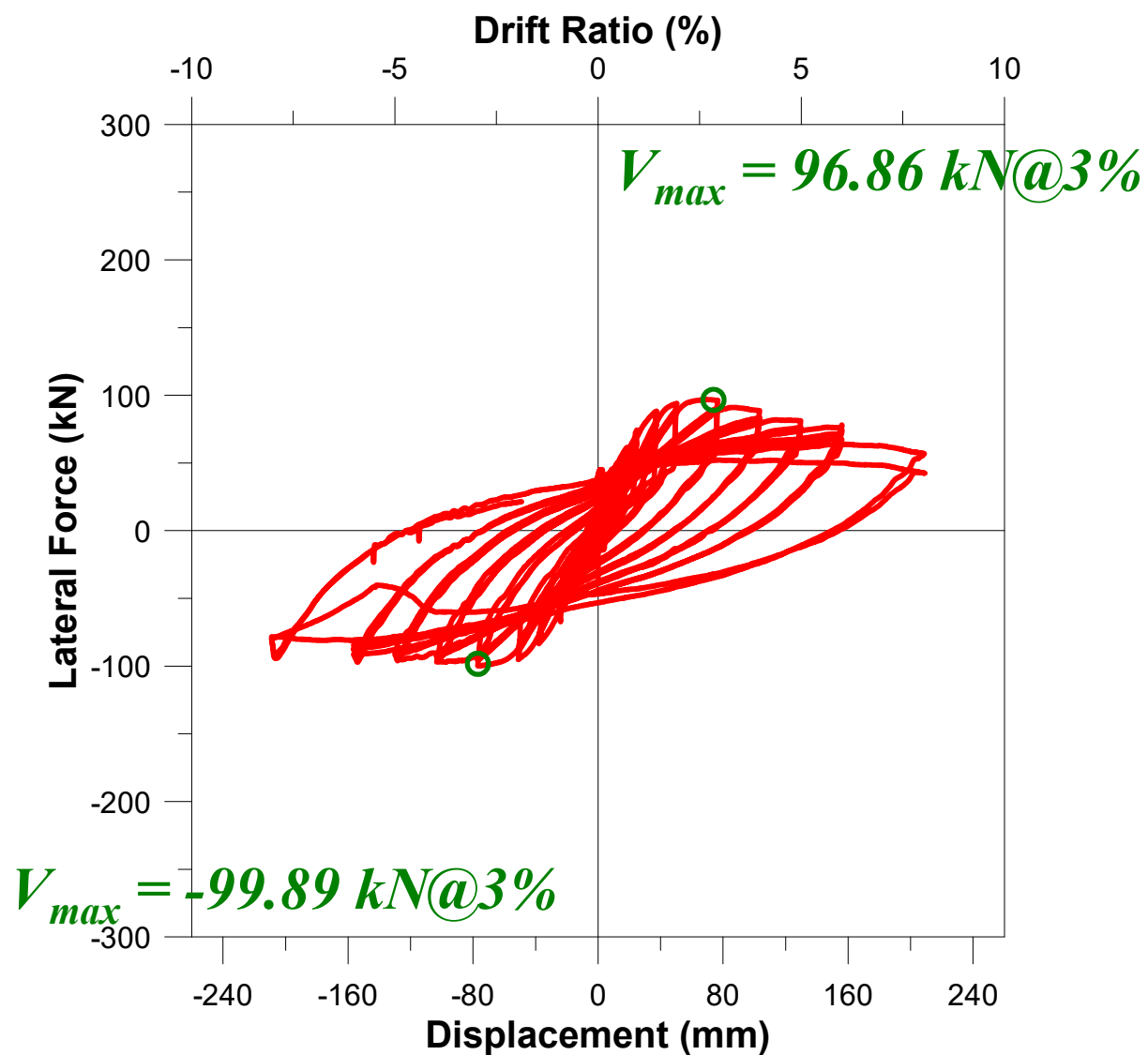
28 Days	f'_c (kgf/cm ²)
Specimen 1	210.16
Specimen 2	220.84
Specimen 3	227.83
平均值	219.61



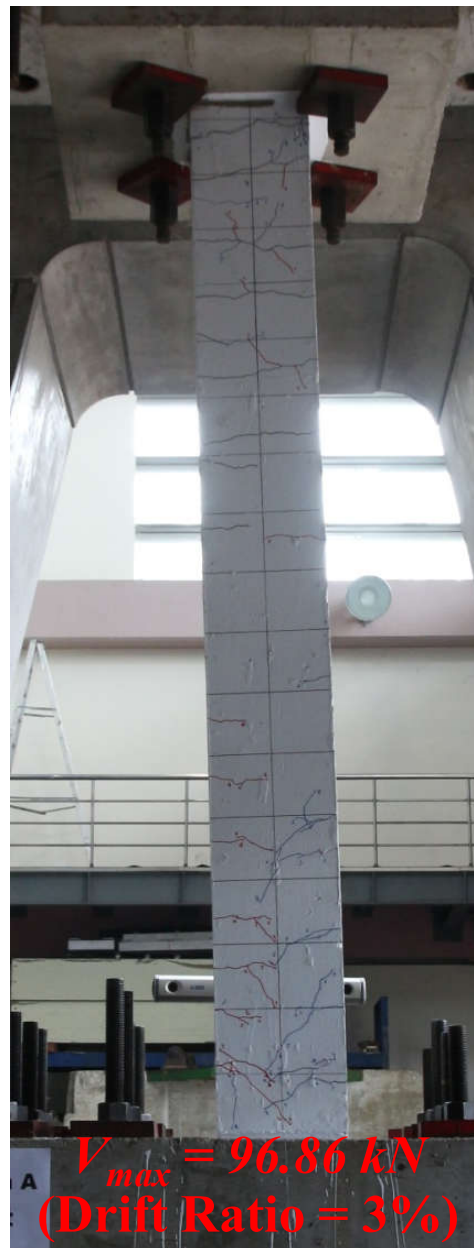
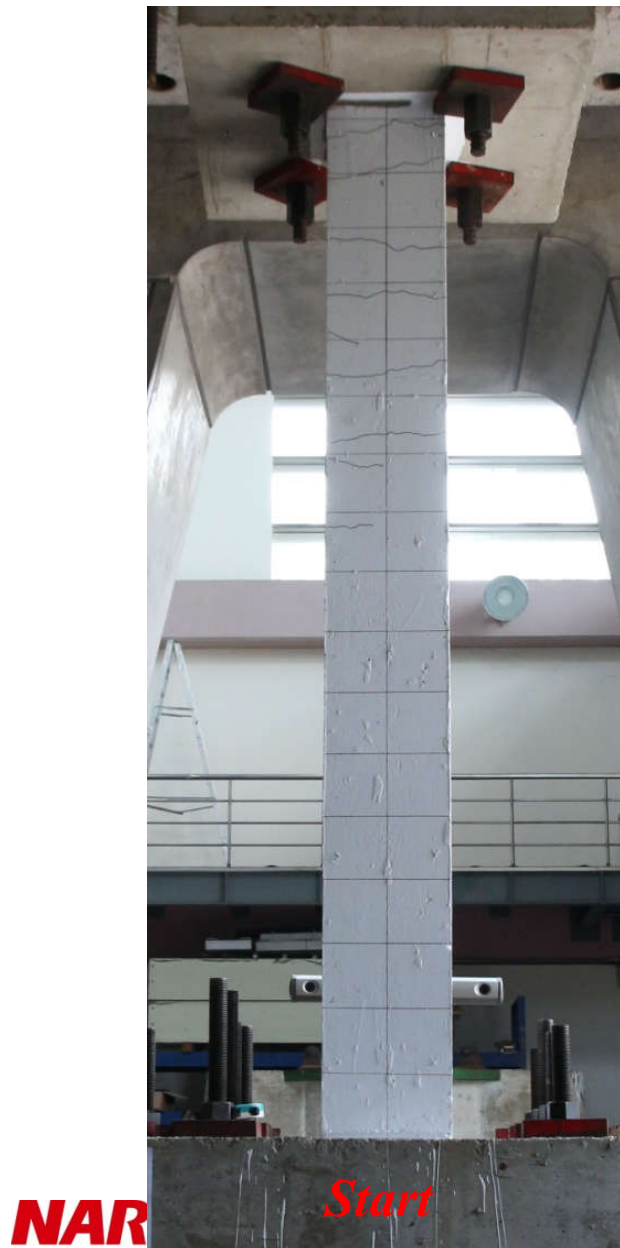
測試結果

- Column A
- Column B

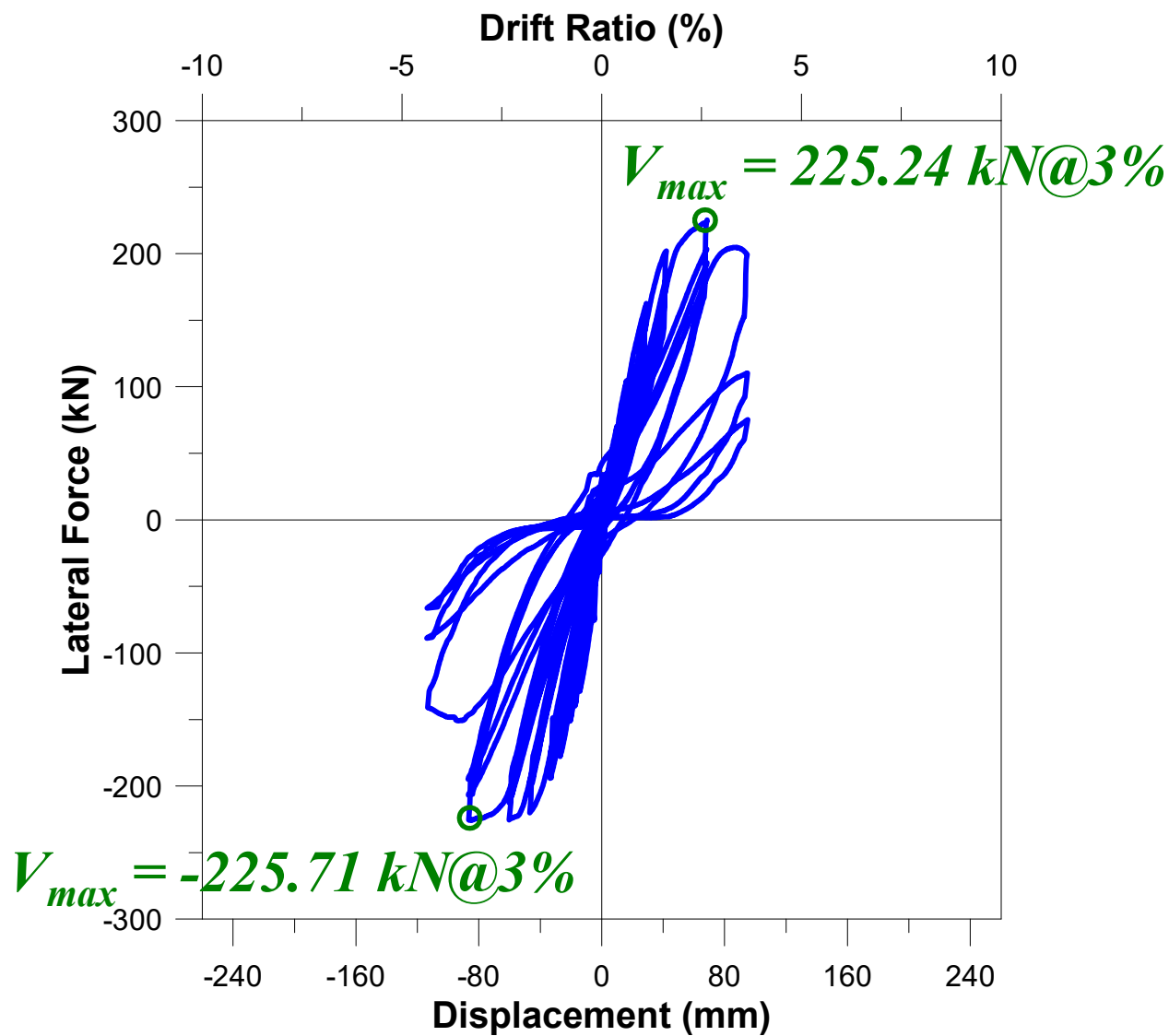
遲滯迴圈 (Column A)



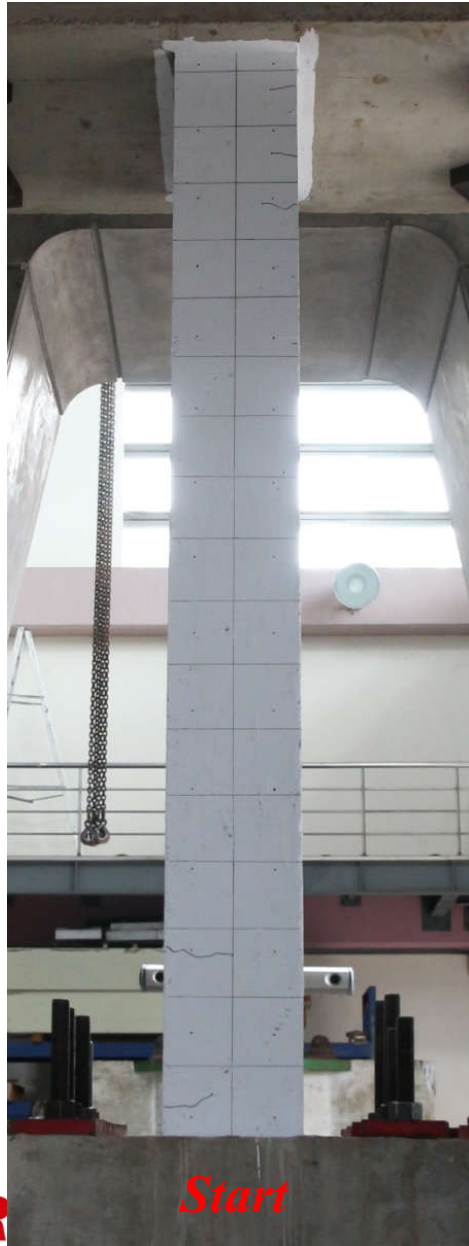
裂縫發展 (Column A)



遲滯迴圈 (Column B)

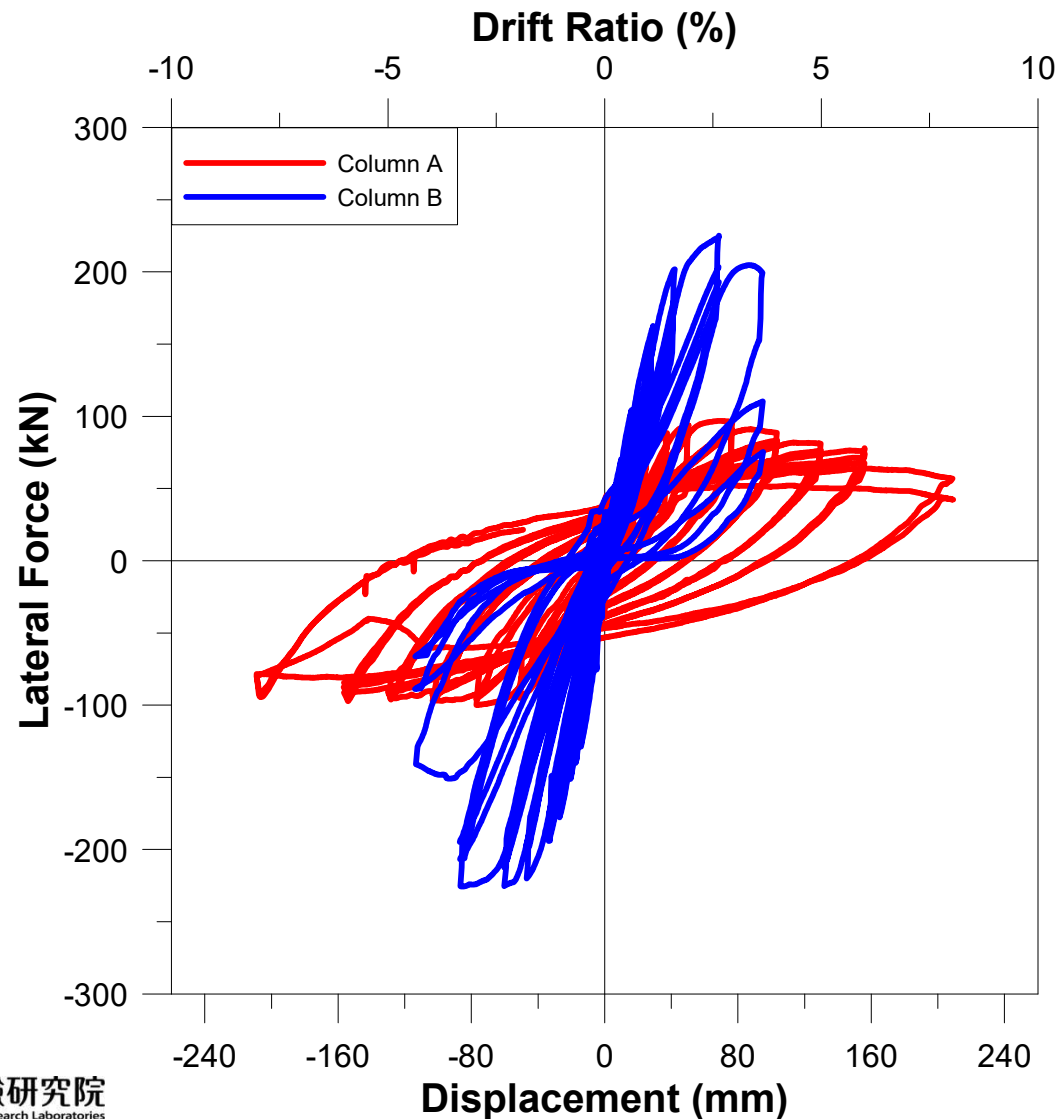


裂縫發展 (Column B)



遲滯迴圈比較

- Column A vs. Column B



簡報結束，敬請指教