單位：

參與人員：

Team ID:(請參見 TeamIDList.doc 加以填寫)

(所有圖表及數據之單位請統一採用: kN, mm, rad, mm/sec^2….)

1.1 分析模型建置方法

請簡介所用結構分析軟體功能特性及本次分析模型建置方法，請至少包含下列項目：

- 結構分析軟體功能特性
- 材料設定(例如應力與應變關係設定方式等)
- 元素種類與特性
- 柱、梁、版、牆及基礎等各類構件勁度與強度估算及設定方法
- 非線性設定方式
- 有否考慮 P-Δ效應、幾何非線性、剛域設定、剛性樓板或軸力與彎矩互制效應
- 阻尼比設定方式
- 數值方法選定(例如 Newmark-β method with constant acceleration 積分方法)
- 特定非線性分析方法簡介(若有採用歷時動力分析以外的分析程序，請簡介該程序)
- 其它有關模擬振動台試驗之特殊考量

簡單範例如下(中英文皆可)：

The computer program for the 3-D non-linear dynamic analysis of this 3-story building specimen is PISA3D, which is developed by National Center for Research on Earthquake Engineering (NCREE), Taiwan. The analysis model is stated as follows:

The finite elements for the columns and the beams of the noted building are modeled by using

the beam-column element and the fiber element, respectively. In order to consider the effect of composite beams, the floor slabs are transformed into equivalent steel section and combined with beam sections. The constraint of floor diaphragms is simulated as rigid diaphragms. Considering only three sides of the building with wall panels, the center of mass for each floor is one-way eccentrically located from the center of geometry. The rigid-end zone and the panel zone are considered for each beam-to-column connection. The noted rigid-end zone and panel zone are simulated by using rigid element and equivalent rotational spring, respectively. The foundation is modeled by equivalent rotational spring, whose stiffness is calculated by using the formula shown in xxx (20xx). The weight of each floor is linearly distributed along the beams. The method of time-integration adopted in PISA3D program is the Newmark-β method with constant acceleration. The Rayleigh damping is adopted with the damping ratios of the first two modes equal to 2%.

The constitutive models for the beam-column elements and the fiber elements are the parallel material and the bilinear material, respectively. The noted parallel material is the combination of the hardening material and the bilinear material. The purpose of the parallel material is to consider the force-deformation relationship under the large story drift. The parameters of the parallel material are calibrated by using the hysteretic loops of the cyclic loading test of column. The material of springs for modeling the panel zones and the foundations is the bilinear material and elastic material, respectively. The geometric nonlinearity is not considered in this finite element model.

1.2 柱構件反覆載重試驗分析模擬

根據本論壇所提供柱構件 Colum A 和 Column B 的反覆載重試驗結果，請簡介有關柱構件的分析模擬方法與結果，若有採用不同分析模擬設定方式下，則請儘量提供分析模擬結果之比較，例如：

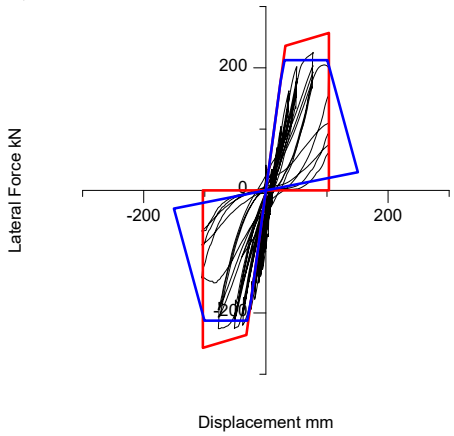


圖*.* Column A 之分析結果與實驗結果比較(ASCE 41-13 與 TEASPA 塑鉸設定結果之比較)

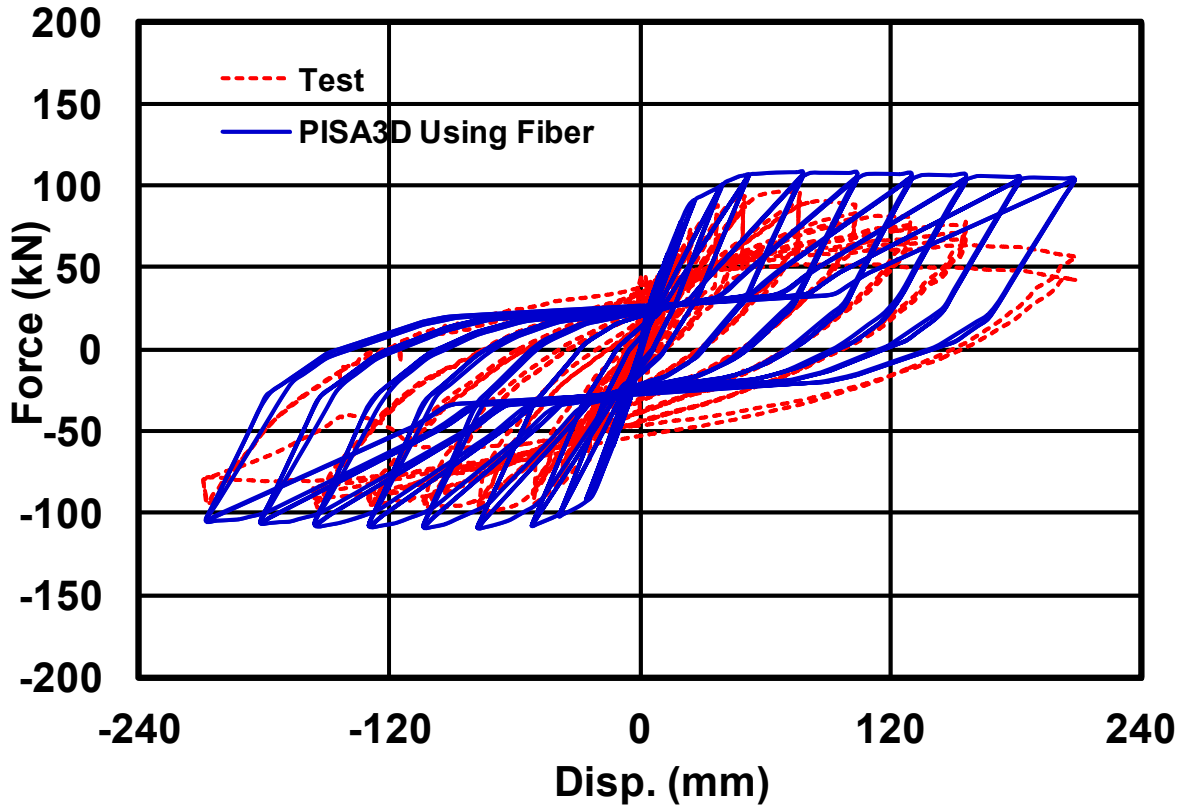


圖*.*　Column A 之分析結果與實驗結果比較(使用纖維元素)

1.3 分析結果

1.3.1 模態分析結果

簡介模態分析結果，請至少包含下列項目，若有不同模型或參數設定方式，亦請儘量提供模態分析結果與比較：

- 樓層重量計算結果
- 結構前三個振態週期
- 模態分析結果簡述

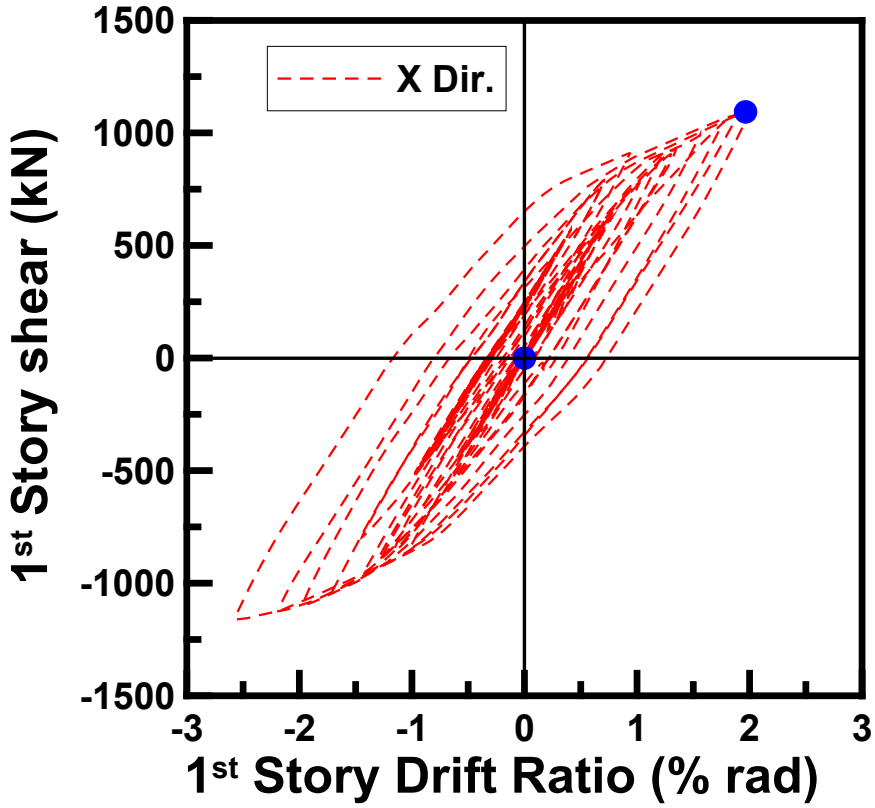
…..

1.3.2 歷時動力分析結果

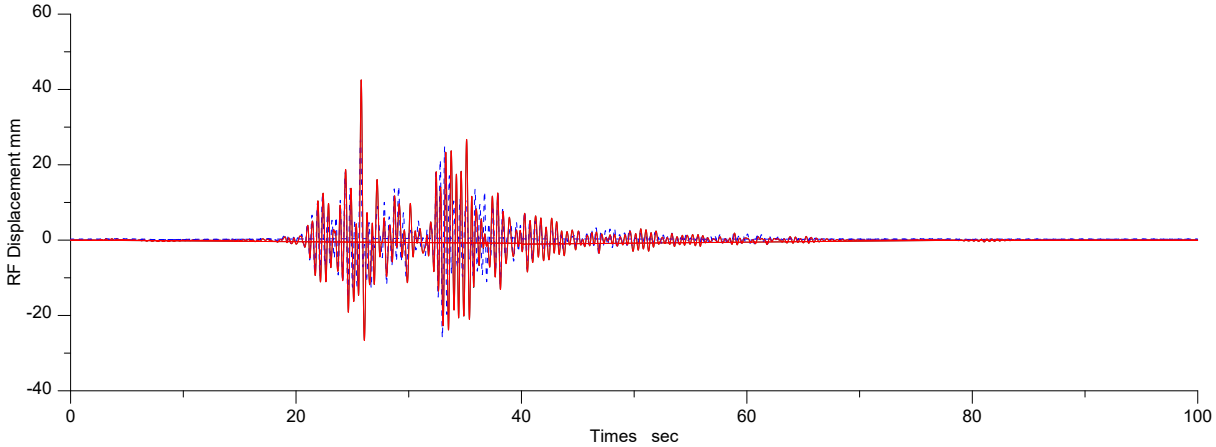
簡介歷時動力分析結果，請至少包含下列項目，若有不同模型或參數設定方式，亦請儘量提供不同分析結果與比較：

- 7/28 日彈性階段第一回合 CHY047 事件(CHY047EL 加速度記錄)與 8/9

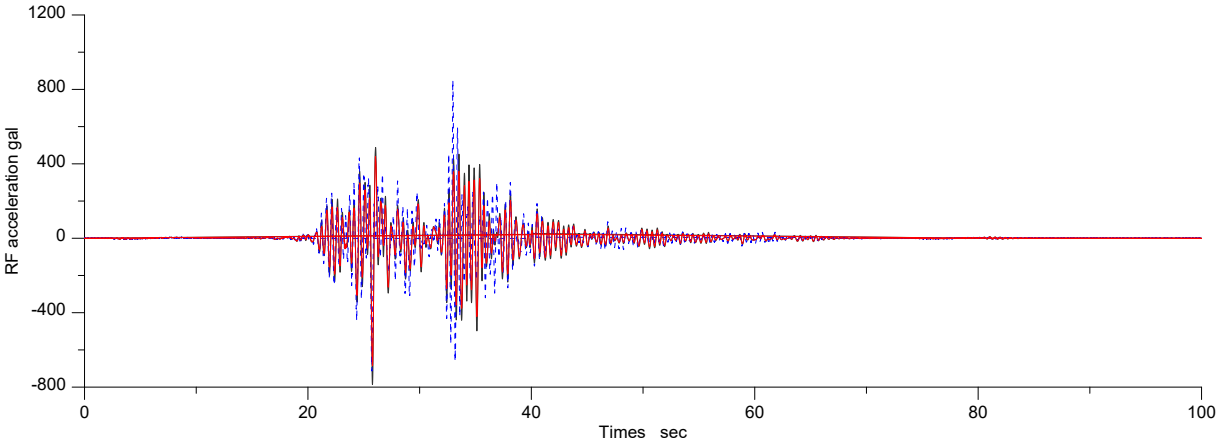
日非彈性階段第二回合 TCU052 事件(TCU052In 加速度記錄)之底層之樓層剪力與樓層側位移角關係分析結果，範例如下：



- 7/28 日彈性階段第一回合 CHY047 事件(CHY047EL 加速度記錄)與 8/9 日非彈性階段第二回合 TCU052 事件(TCU052In 加速度記錄)之試體構架短向(X Dir.)頂層位移歷時，範例如下：



- 7/28 日彈性階段第一回合 CHY047 事件(CHY047EL 加速度記錄)與 8/9 日非彈性階段第二回合 TCU052 事件(TCU052In 加速度記錄)之試體構架短向(X Dir.)頂層加速度歷時，範例如下：



● 其它相關分析結果，例如：

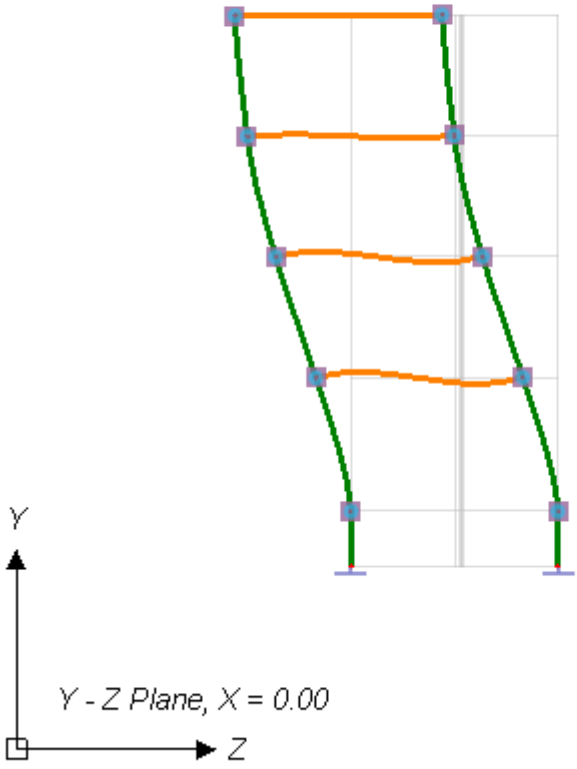


圖*.* 結構短向之最大側向變形分析結果

1.4 分析用電腦與效能

請簡介分析所使用的電腦環境及分析所花費時間，範例如下：

Computational environment and name of computer:

PISA3D program is both developed for commercial and research.

CPU Time: Analysis Time Elapsed: 8 Min. 12.013 Sec.

1.5 分析模擬心得與建議

1.5.1 心得

請針對此次振動台試驗分析模擬過程，提供其中分析比較之發現或結論，以及相關感想與心得。

1.5.2 建議

請提供未來結構分析模擬技術方面之方向、實務需求與建議。