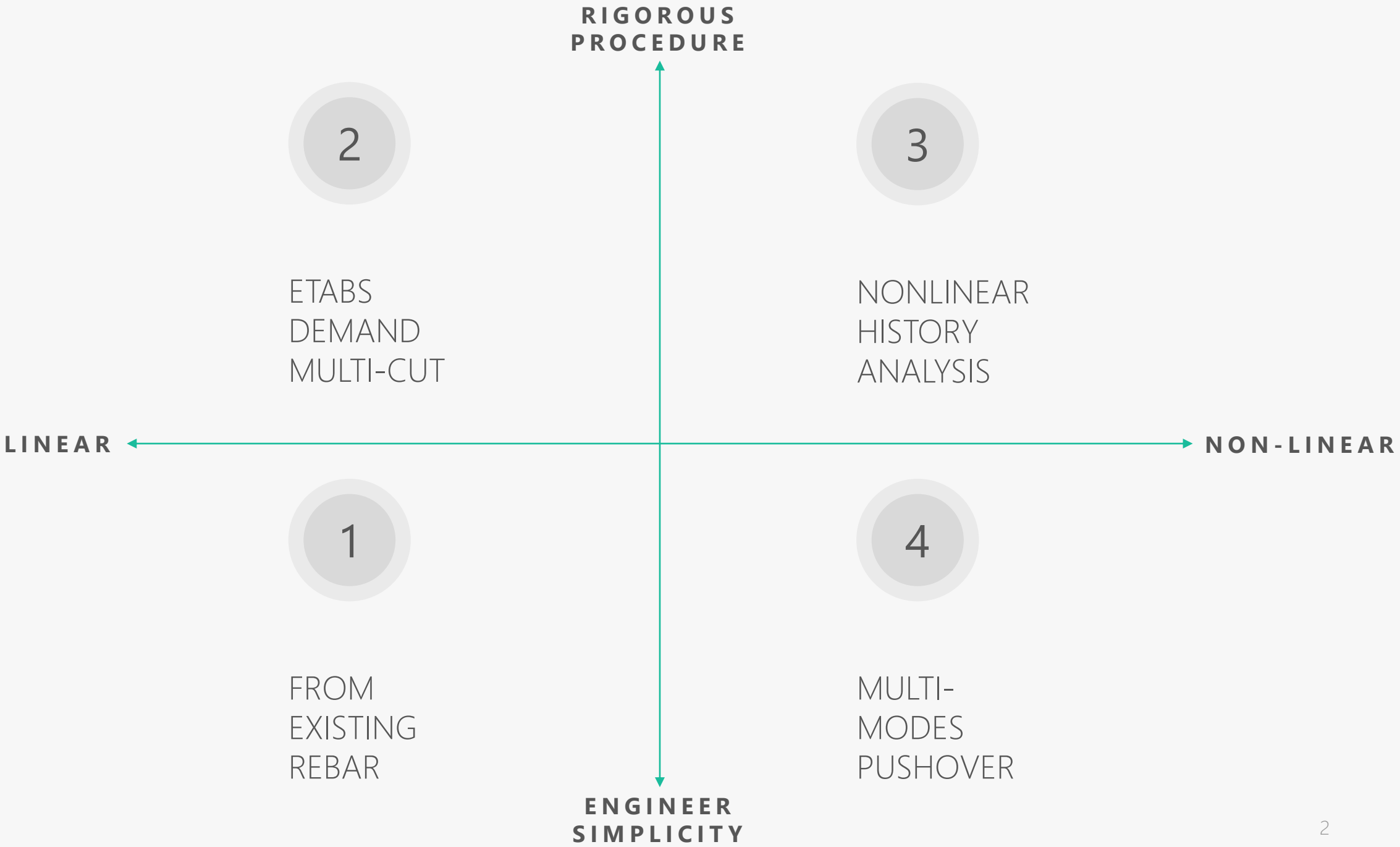
MULTI-CUT REBAR(8)

Advisor : Prof. K.C.Chang

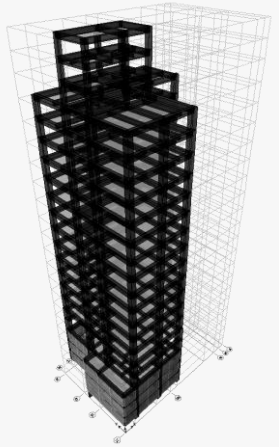
Presenters : You-Ran Nai

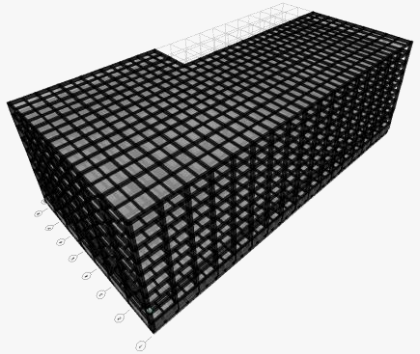

RIGOROUS
PROCEDURE
2
ETABS
DEMAND
MULTI-CUT
3
NONLINEAR
HISTORY
ANALYSIS
LINEAR
NON-LINEAR
1
FROM
EXISTING
REBAR
4
MULTI-
MODES
PUSHOVER
ENGINEER
SIMPLICITY

雙箍延伸長度

$$K_{tr} = \frac{A_{tr} f_{yt}}{105sn}$$

$$\ell_d = \frac{0.28 f_y}{\sqrt{f'_c}} \frac{\psi_t \psi_e \psi_s \lambda}{\left(\frac{c_b + K_{tr}}{d_b} \right)} d_b$$





OVERALL RESULT

1.5%

0.6%

剪力多點斷筋

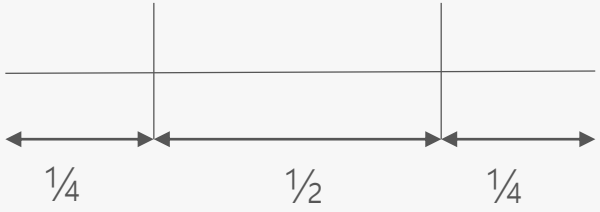
Now Solution

$ETBAS$ 中央 $Vc = 0$

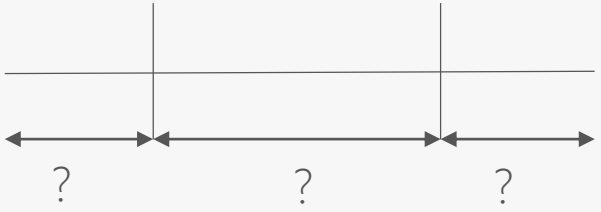
Next Solution

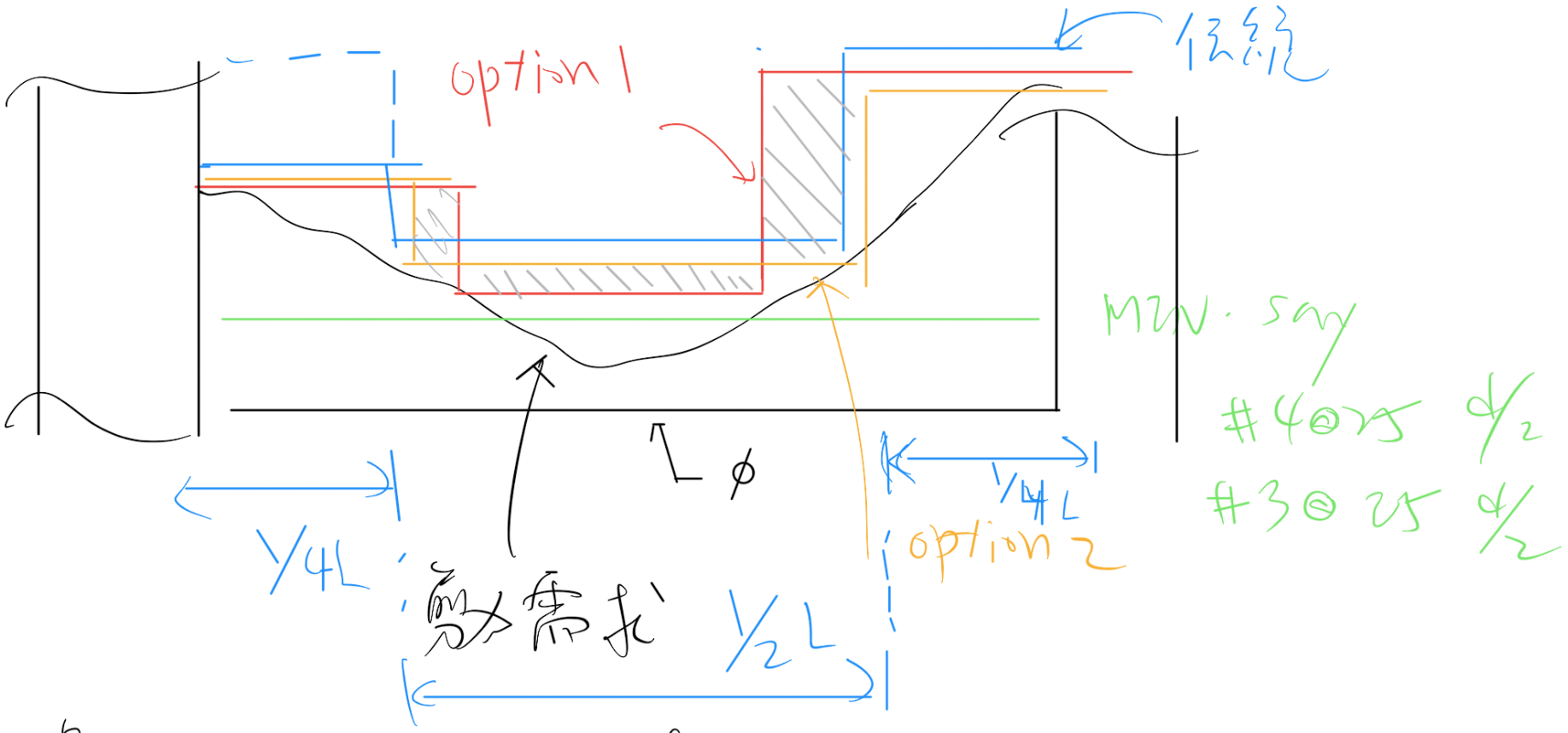
$\phi Vn = \phi Vs' + \phi Vc = Vu = \phi Vs$

Now Solution



Next Solution



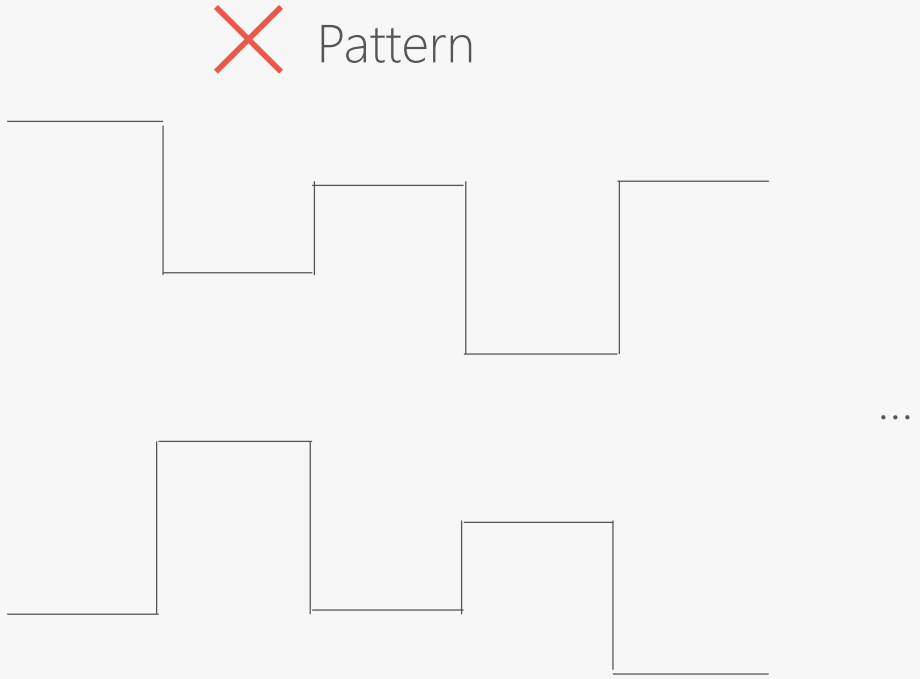


Best = Optimized (optim 1, 2, ···)

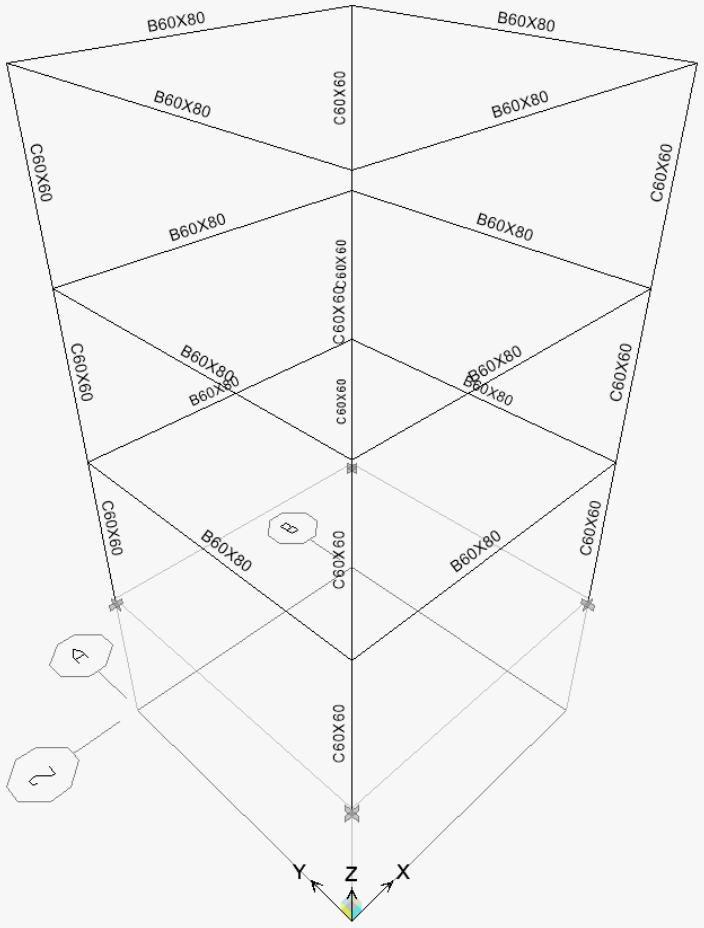
—— : 传统面临 even 左右对称

5 MULTI CUT

	主筋					長度				
	左1	左2	中	右2	右1	左1	左2	中	右2	右1
上層 第一排	2-#7	2-#7	3-#7	3-#7	3-#7	50	307	49	10	49
上層 第二排	0	0	0	0	0					
下層 第二排	0	0	0	0	0					
下層 第一排	2-#7	2-#7	2-#7	2-#7	2-#7	50	10	346	10	49
上層 第一排	3-#7	3-#7	3-#7	2-#7	2-#7	60	80	350	10	60
上層 第二排	0	0	0	0	0					
下層 第二排	0	0	0	0	0					
下層 第一排	2-#7	2-#7	2-#7	2-#7	2-#7	60	10	420	10	60



Benchmark Model



$Beam: 60x80cm$
$DL: 0.2t/m^2$
$LL: 0.3t/m^2$

$Beam: 50x70cm$
$DL: 0.2t/m^2$
$LL: 0.3t/m^2$

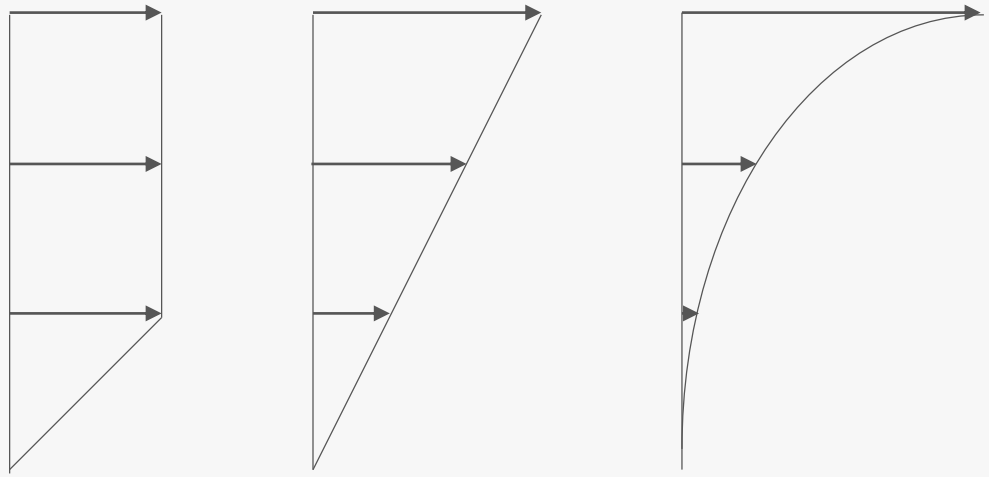
$Beam: 60x80cm$
$DL: 0.3t/m^2$
$LL: 0.5t/m^2$

主筋各號數	sum	100.0%	主筋各號數		
使用比例	#7	75.7%	優化比例	#7	92.5%
	#8	9.3%		#8	95.1%
	#10	10.7%		#10	96.5%
	#11	2.6%		#11	99.7%
	#14	1.7%		#14	105.7%
	#18			#18	

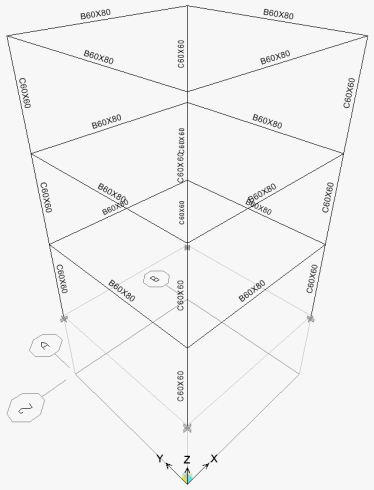
Pushover

$$F_x = C_{vx} V$$

$$C_{vx} = \frac{w_x h_x^k}{\sum_{i-1}^{n} w_i h_i^k}$$

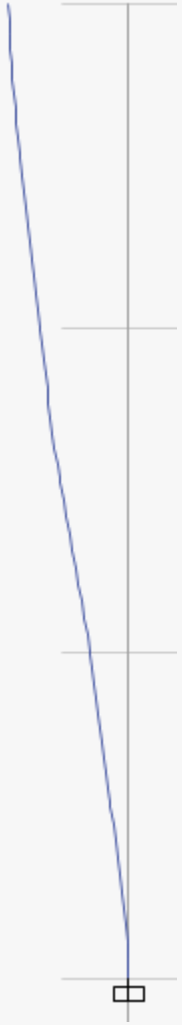


$k = 0$ $k = 1$ $k = 2$

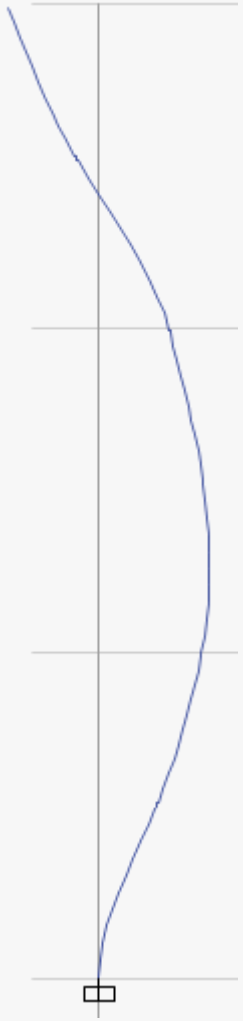


Pushover

$Mode\ 1$



$Mode\ 4$



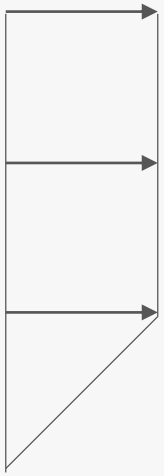
MMC:

$Mode1 * 0.85 + Mode4 * 0.11$

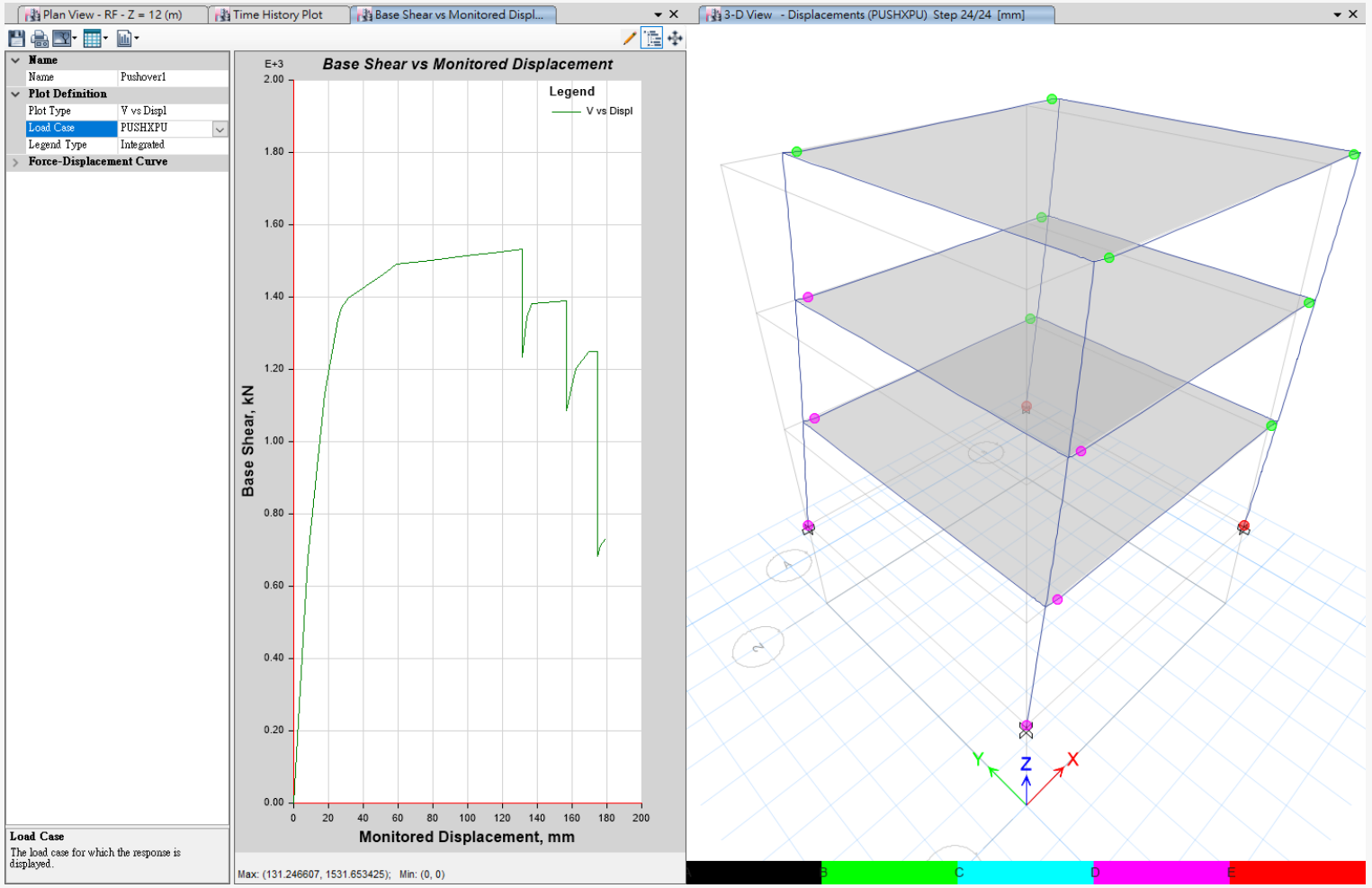
$$F_j = \sum_{n=1}^{N} \Gamma_n \phi_{n\,j}$$

Max Base Shear: 1532kN

Max Disp: 131mm

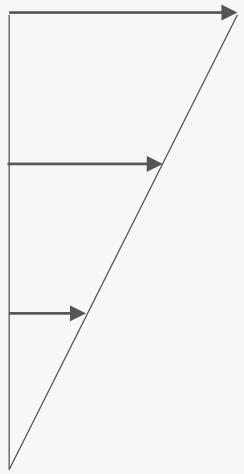


$k = 0$

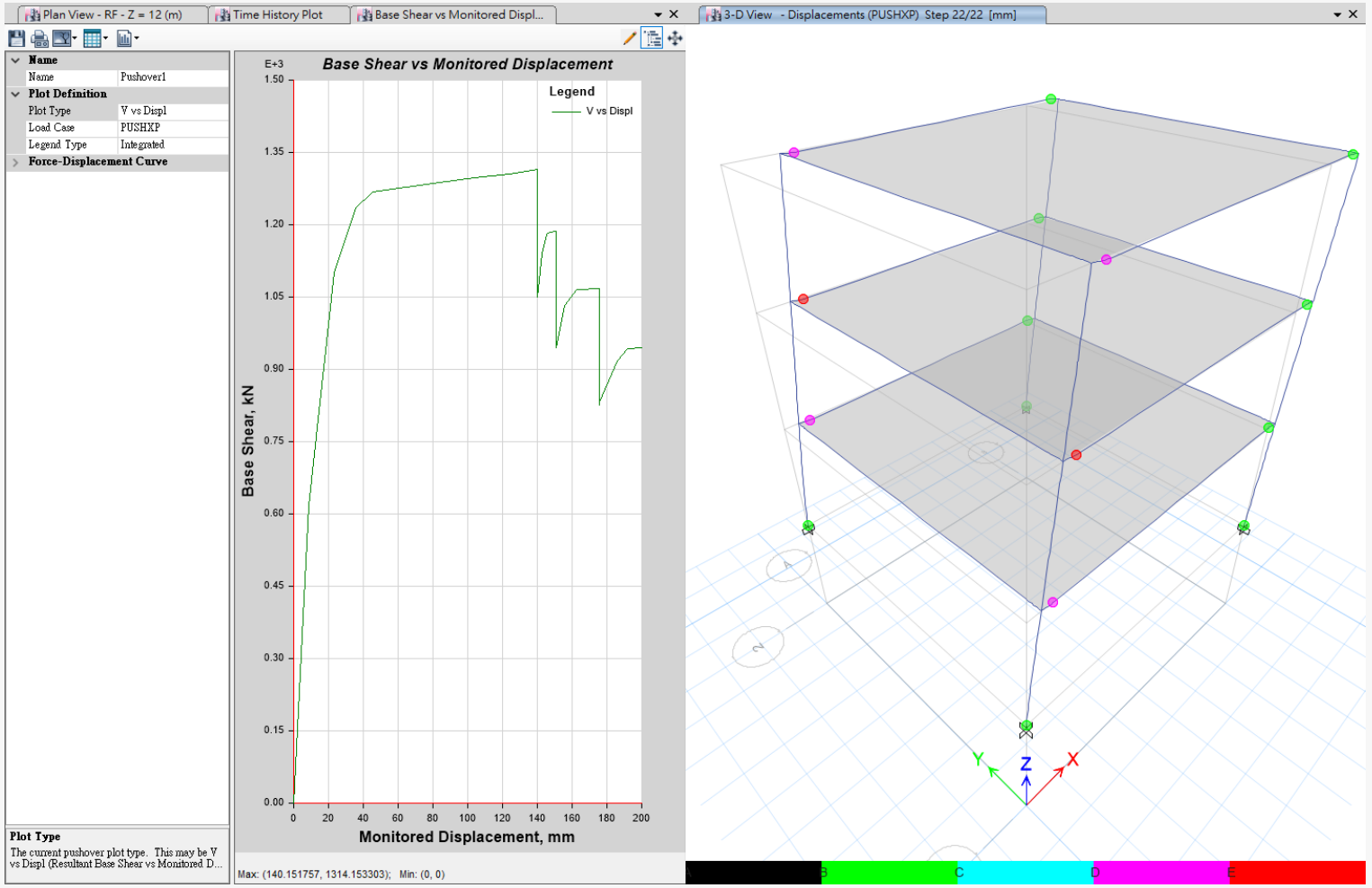


Max Base Shear: 1314kN

Max Disp: 140mm

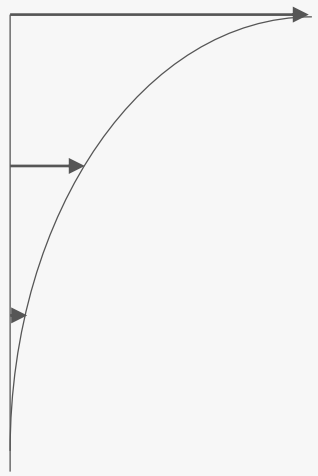


$k = 1$

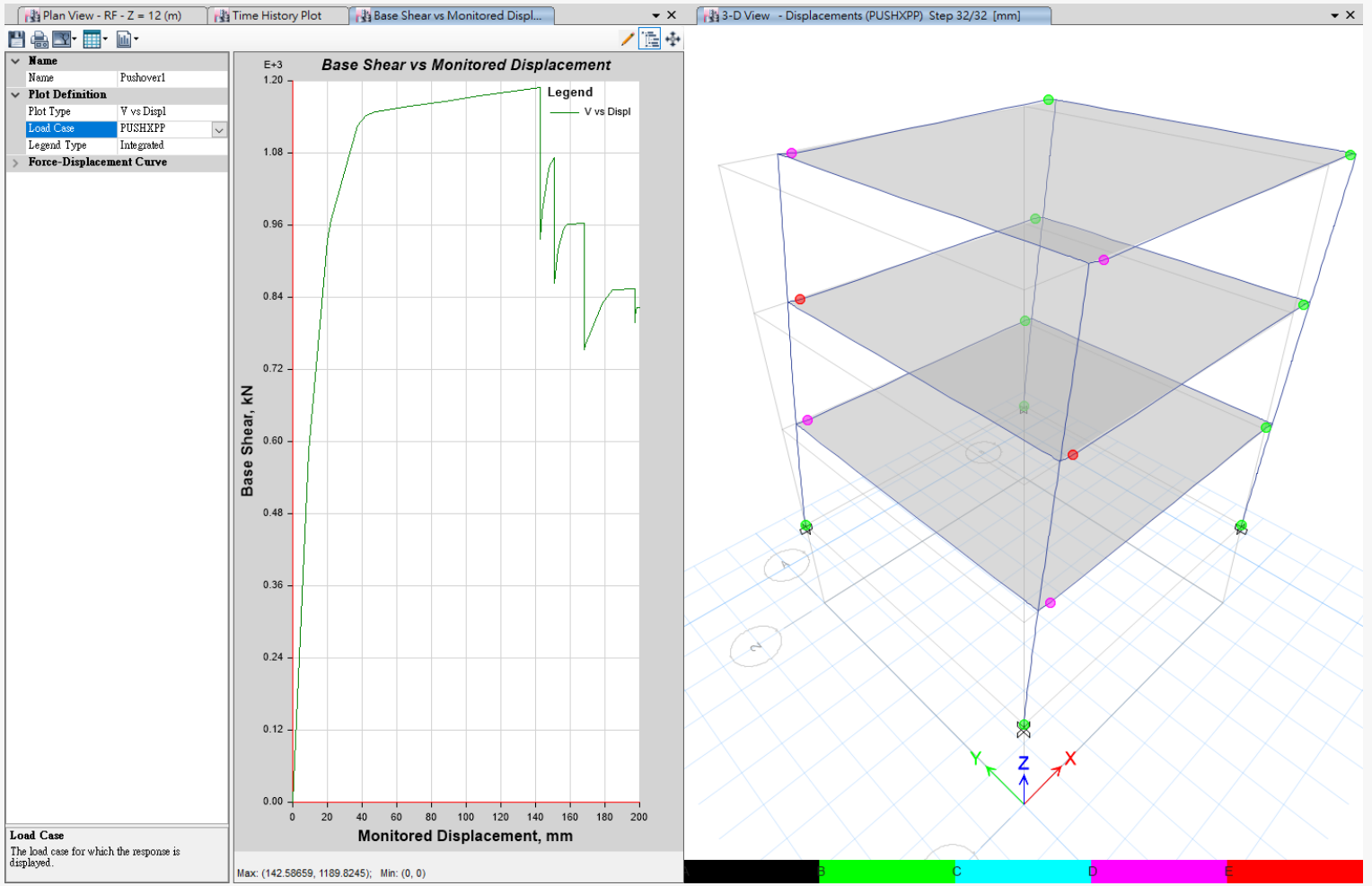


Max Base Shear: 1190kN

Max Disp: 143mm



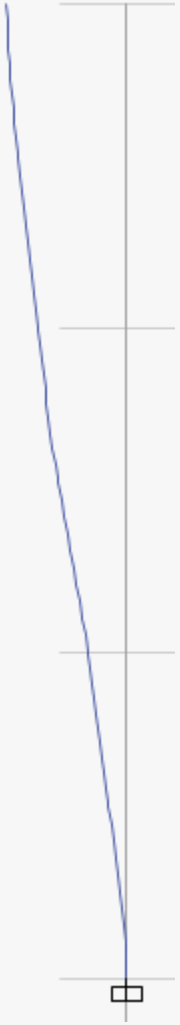
$k = 2$

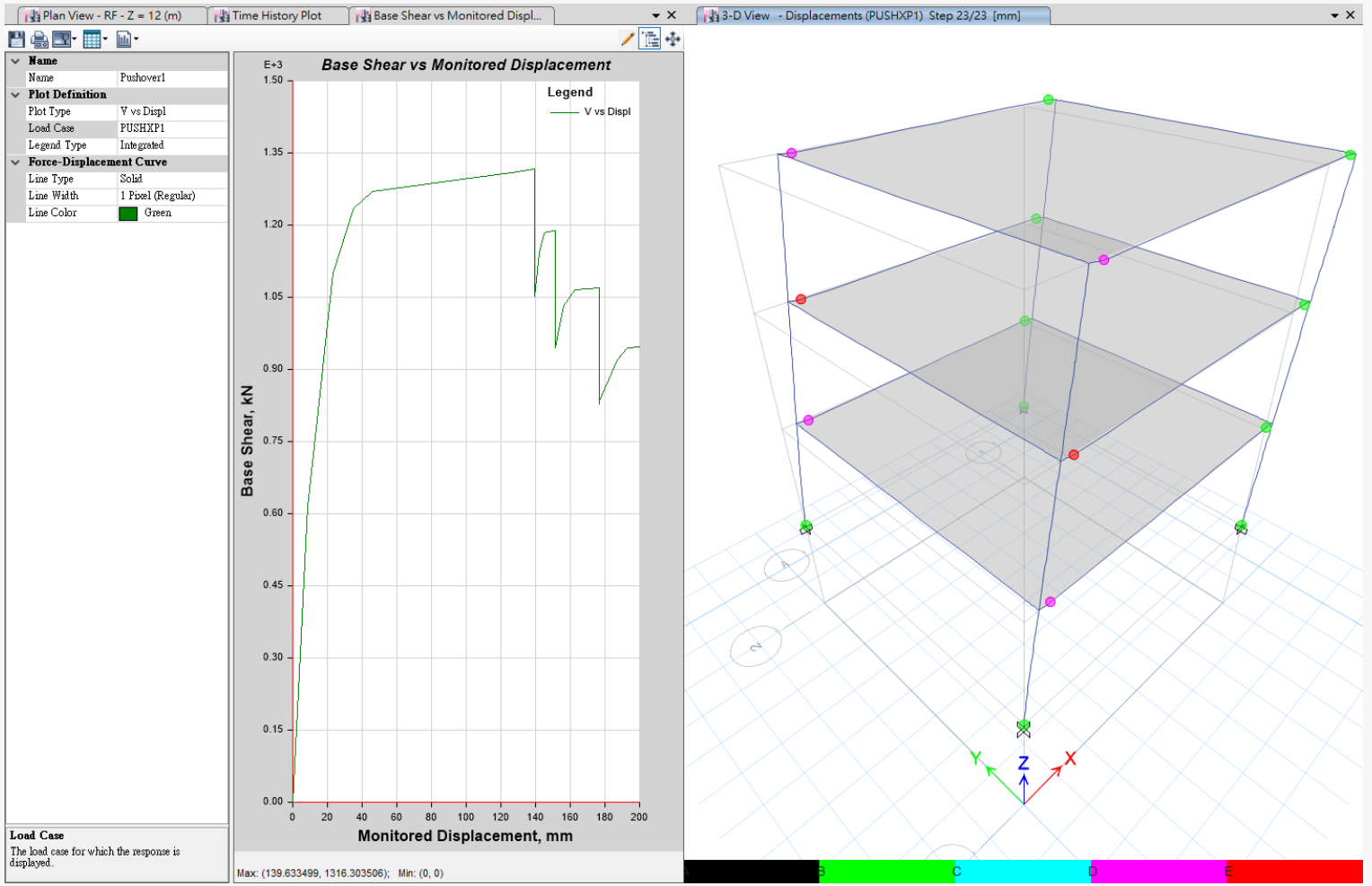


Max Base Shear: 1316kN

Max Disp: 140mm

$Mode\ 1$

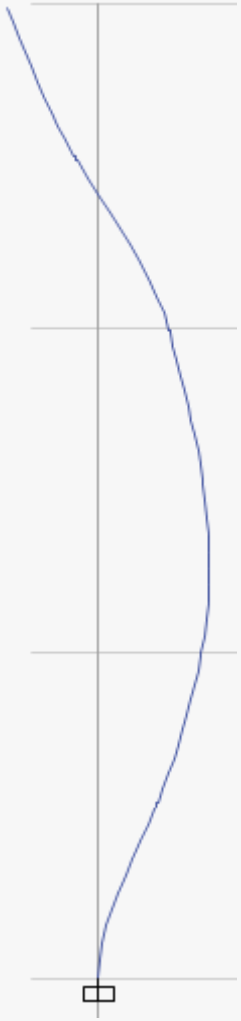


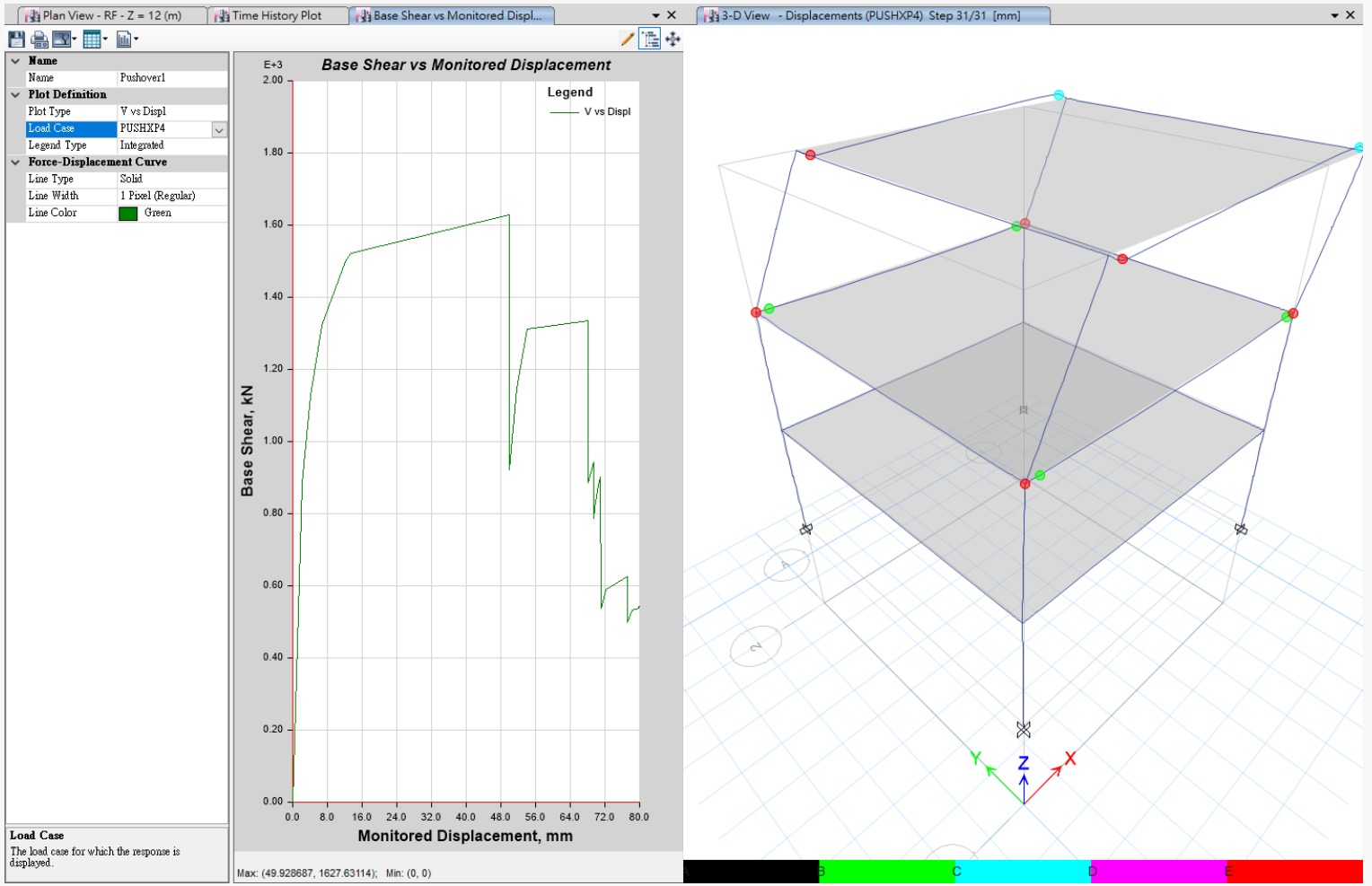


Max Base Shear: 1627kN

Max Disp: 50mm

Mode 4





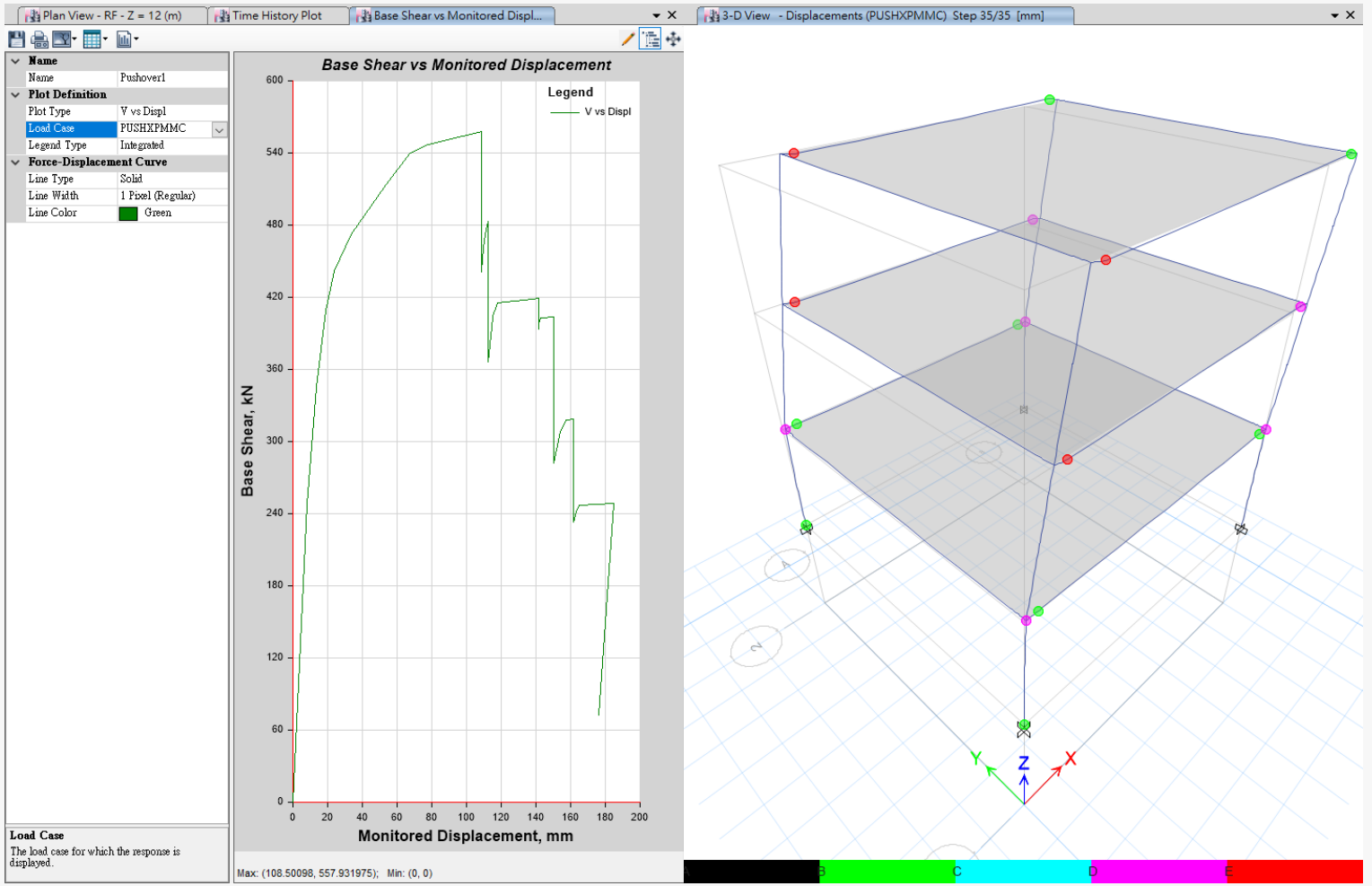
Max Base Shear: 558kN

Max Disp: 109mm

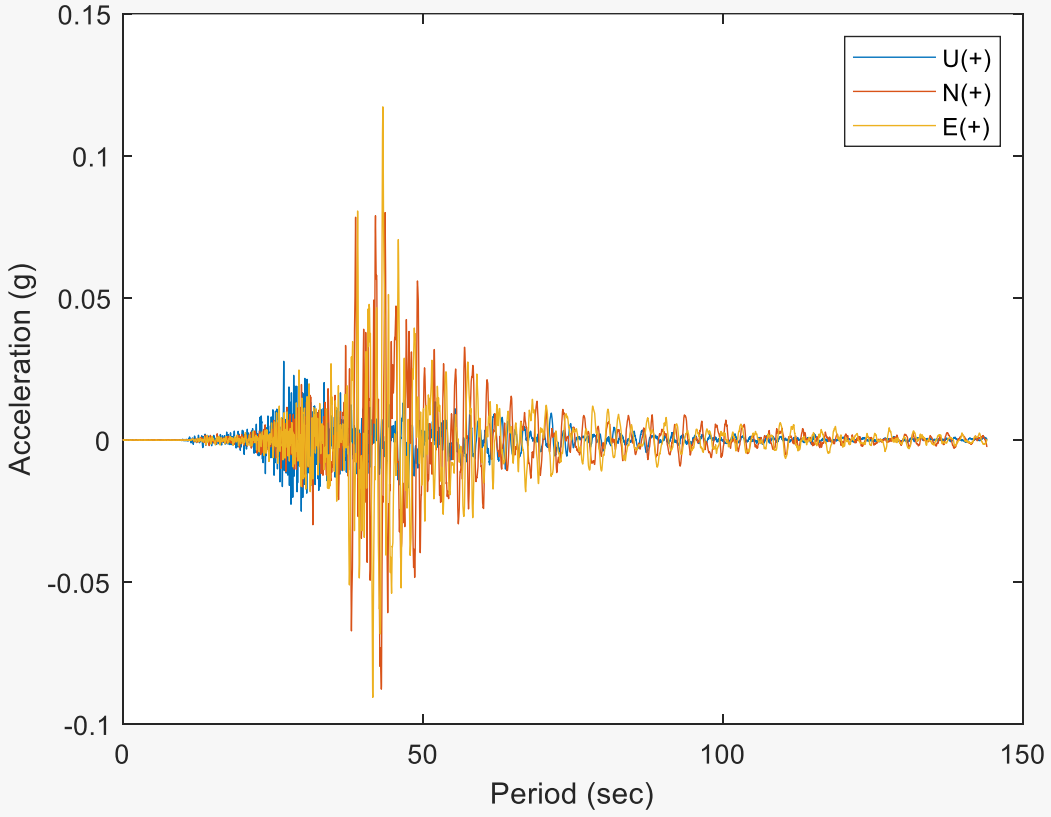
MMC:

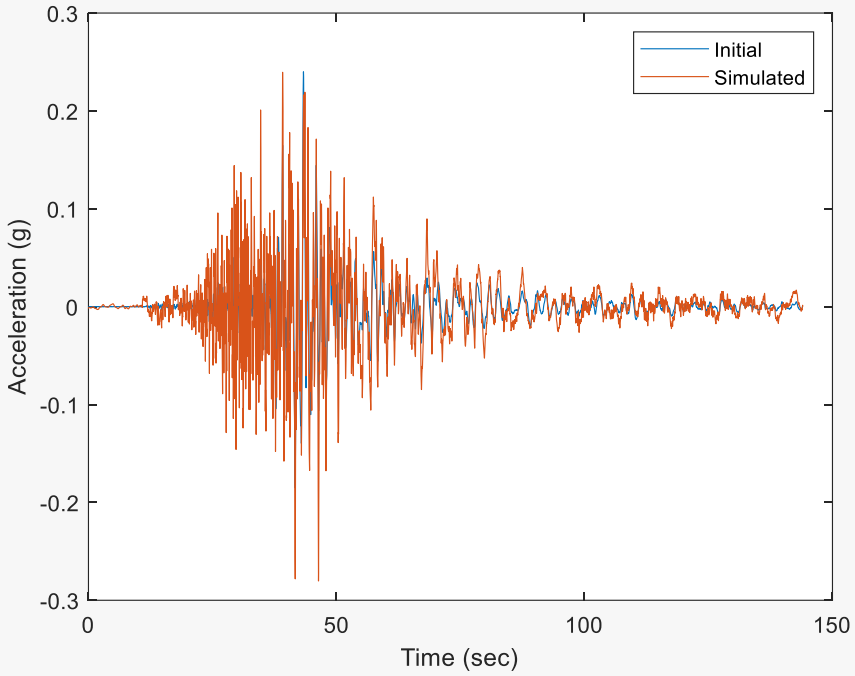
$$Mode1 * 0.85 + Mode4 * 0.11$$

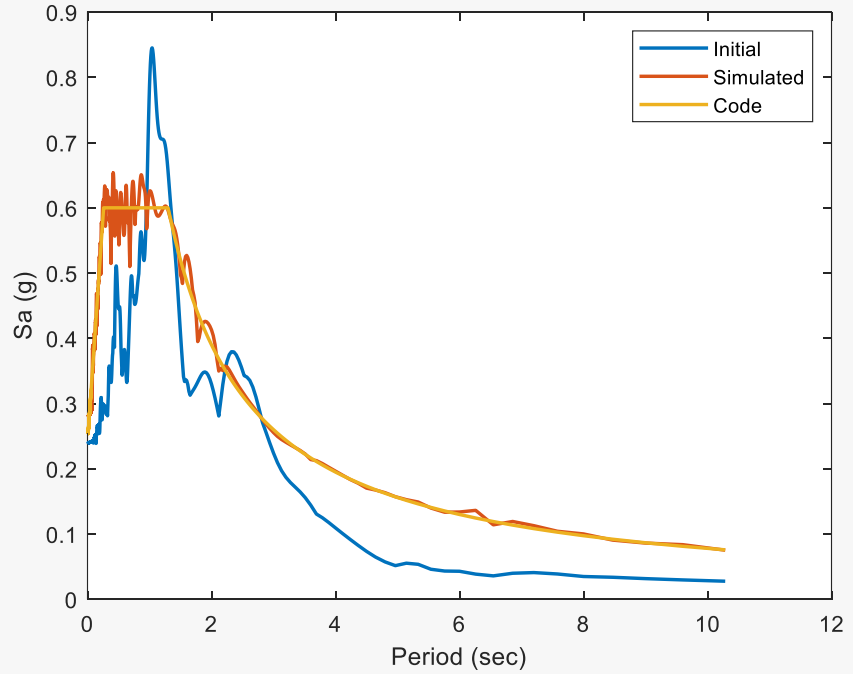
$$F_j = \sum_{n=1}^{N} \Gamma_n \phi_{n\,j}$$



chichi TAP010





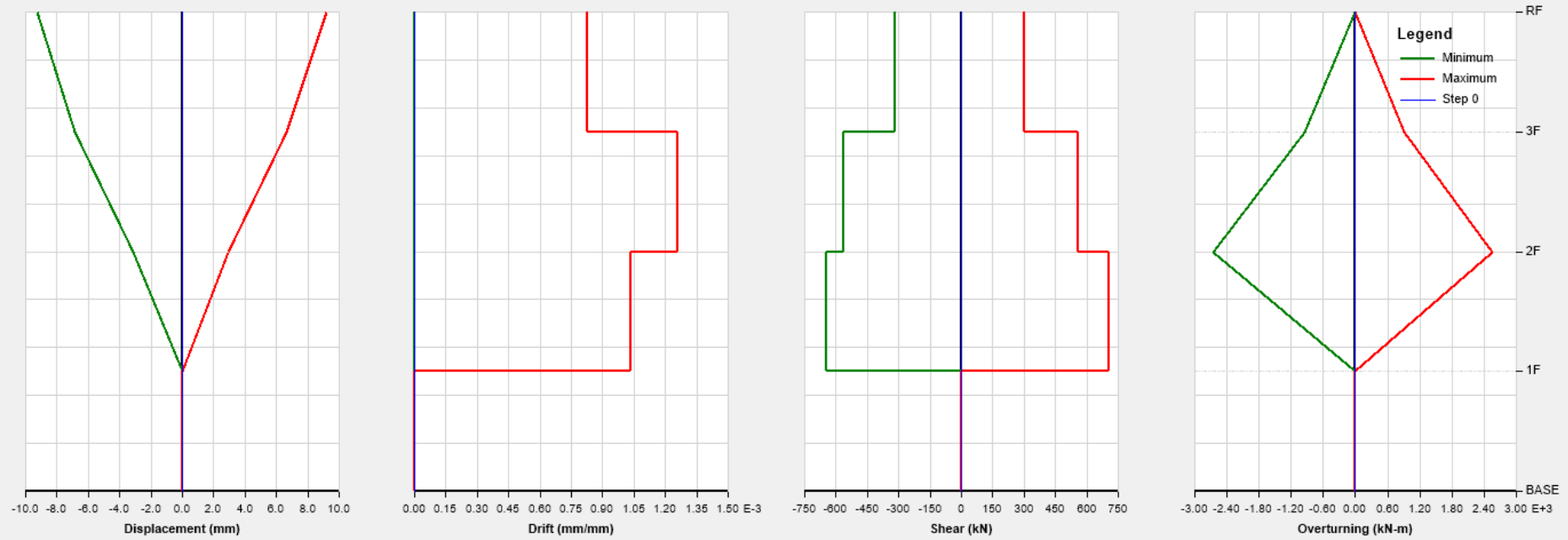


Combined Story Response

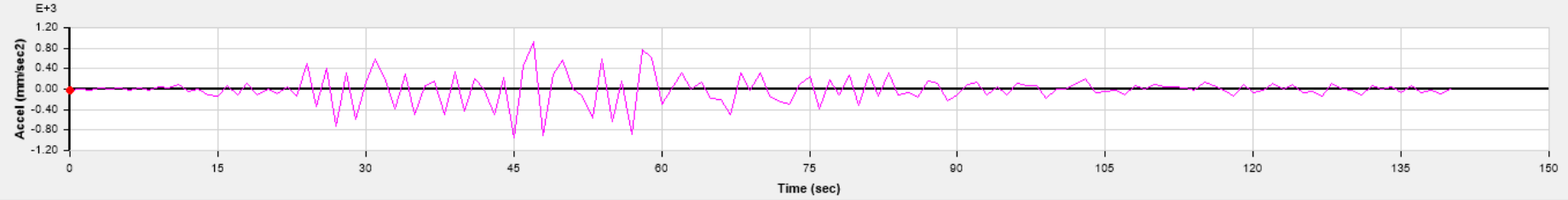
Control Data

Tower: T1 | Load Case: artificial TAP010 | Load Step: 0 | Direction: X | Graph 1 Type: Displacement | Animate | Slower | Faster

Story Response

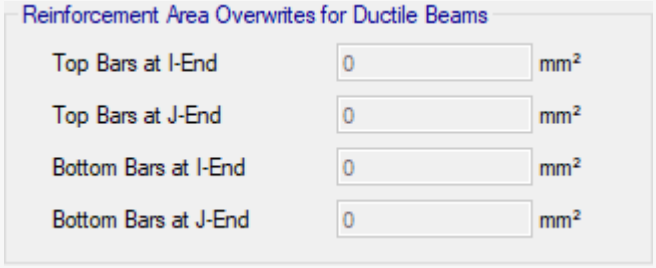


Input Function



OK | Cancel

Nonlinear Hinge



Roadmap

Now

Benchmark
IDA

Next

人工斷筋

03/2016

開發程式