NEW STRUCTURE

挫屈束制斜撐設計施工

案例簡介

新構造工程顧問股份有限公司
夏沛禹　　李忠錦
2015/11/13

建築及結構概要

NEW STRUCTURE

1.地上24層，地下4層，1F~3F餐飲、會議空間。
4F以上一般事務所用途。
建築高度89.55m，開挖深度16.5m。
1F高6.0m，2F、3F高4.5m，標準層高3.55m。

2.基礎採地中壁及3m深筏基共構。

3.開挖採內支撐明挖配合地中壁及扶壁，
共6層水平支撐。

4.B1F~6F採SRC柱及SC梁，其餘樓層採用RC
構造。

5.長向採用韌性剛構架、短向採韌性剛構架及
挫屈束制斜撐二元系統。

NEW STRUCTURE

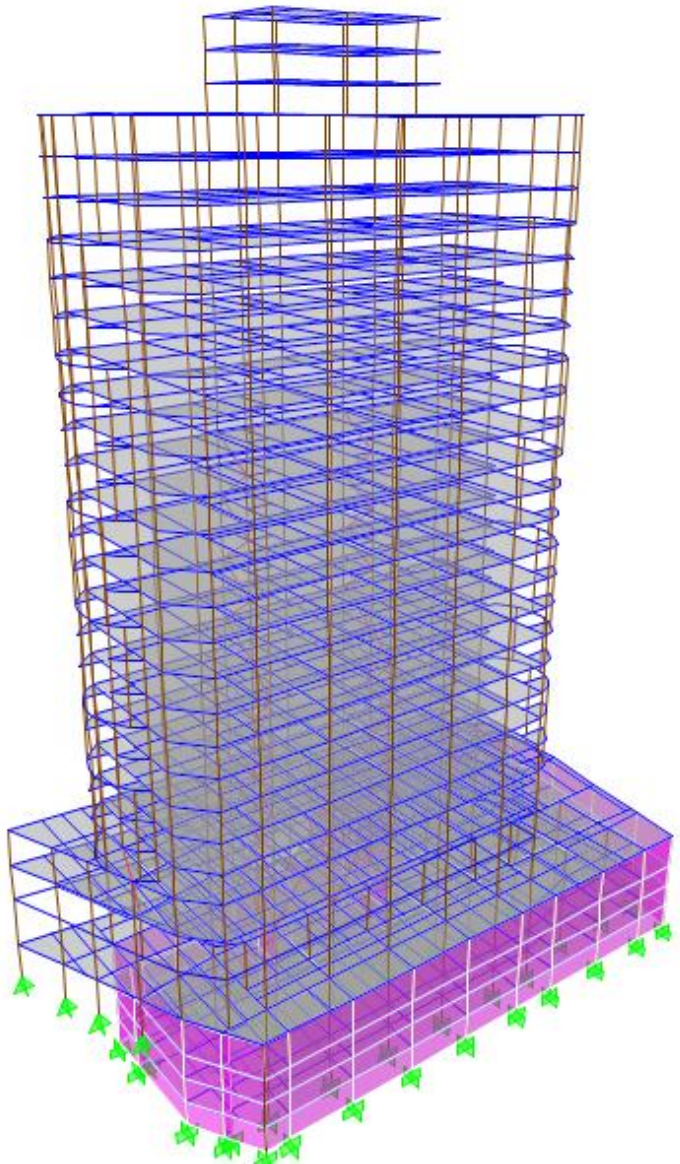
柱、梁尺寸

柱尺寸：

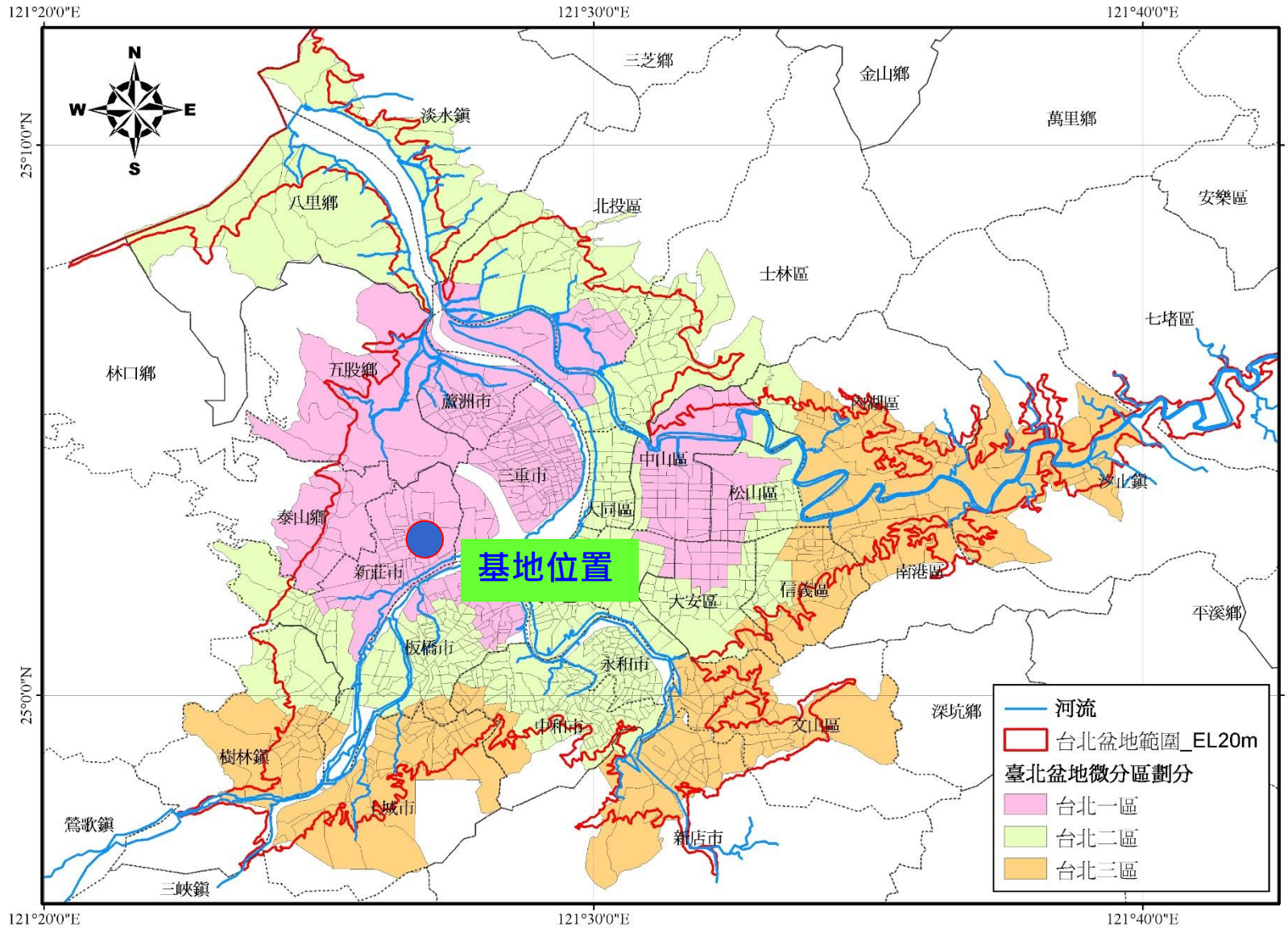
90×150	RC (6F至RF)
BOX-60×90+RC90×150	SRC (B1F至5F)
90×180、110×140	RC (B4F至B2F)

大梁尺寸：

80×90~80×75	RC(7F至RF)
H-70×40+RC 70×90 SRC	
or H-55×40+RC 60×75	SRC (5F~6F)
H-80×40	SC (2F~4F)
H-60×30+RC 50×90	SRC (1F)



地震分區

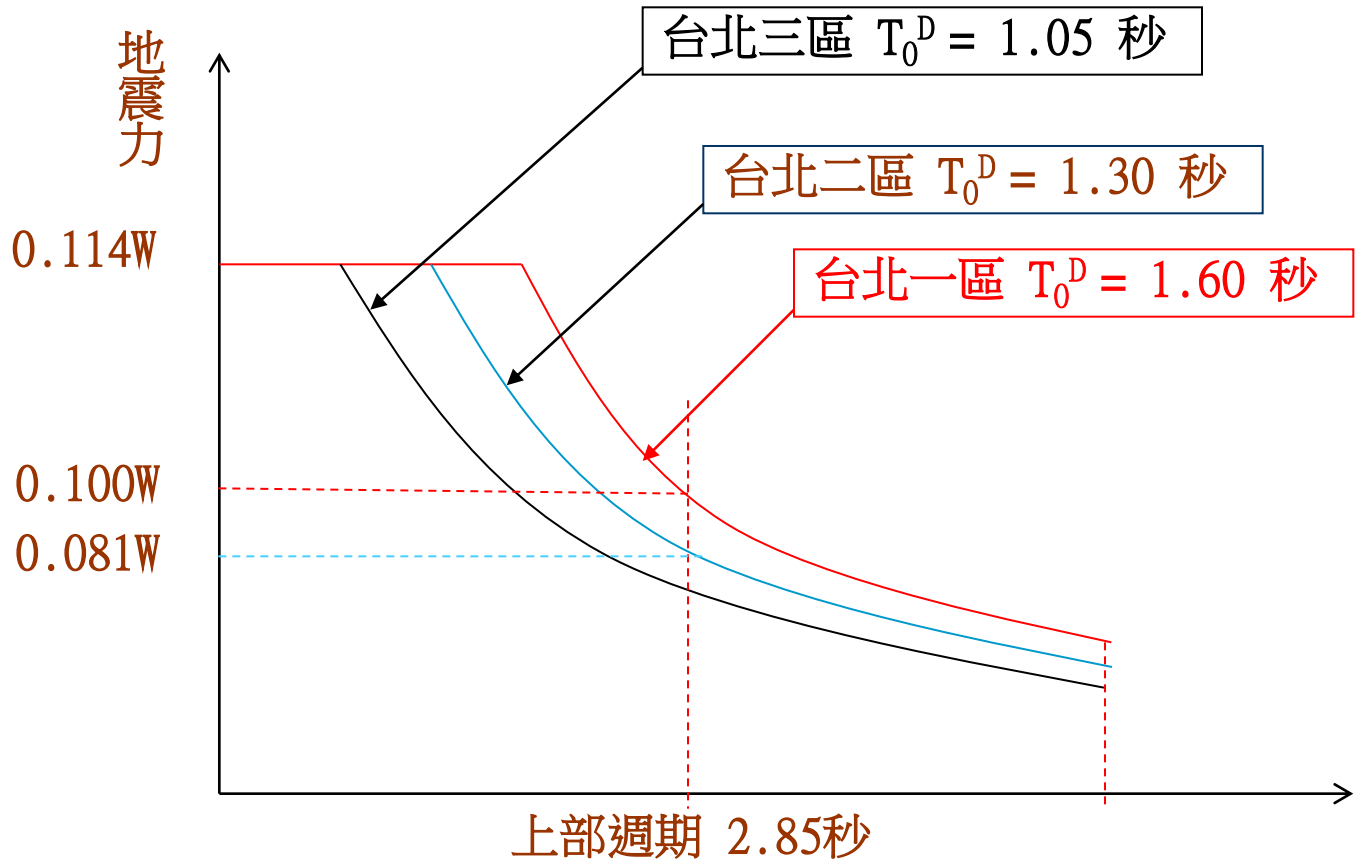

121°20'0"E
121°30'0"E
121°40'0"E
25°10'0"N
25°0'0"N
N
W
E
S
三芝鄉
金山鄉
萬里鄉
淡水鎮
八里鄉
北投區
安樂區
士林區
七堵區
林口鄉
五股鄉
蘆洲市
內湖區
中山區
三重市
松山區
汐止鎮
泰山鄉
大同區
基地位置
新莊市
南港區
信義區
大安區
平溪鄉
板橋市
永和市
深坑鄉
中和市
文山區
樹林鎮
土城市
鶯歌鎮
新店市
三峽鎮
河流
台北盆地範圍_EL20m
臺北盆地微分區劃分
台北一區
台北二區
台北三區

地震力說明

NEW STRUCTURE

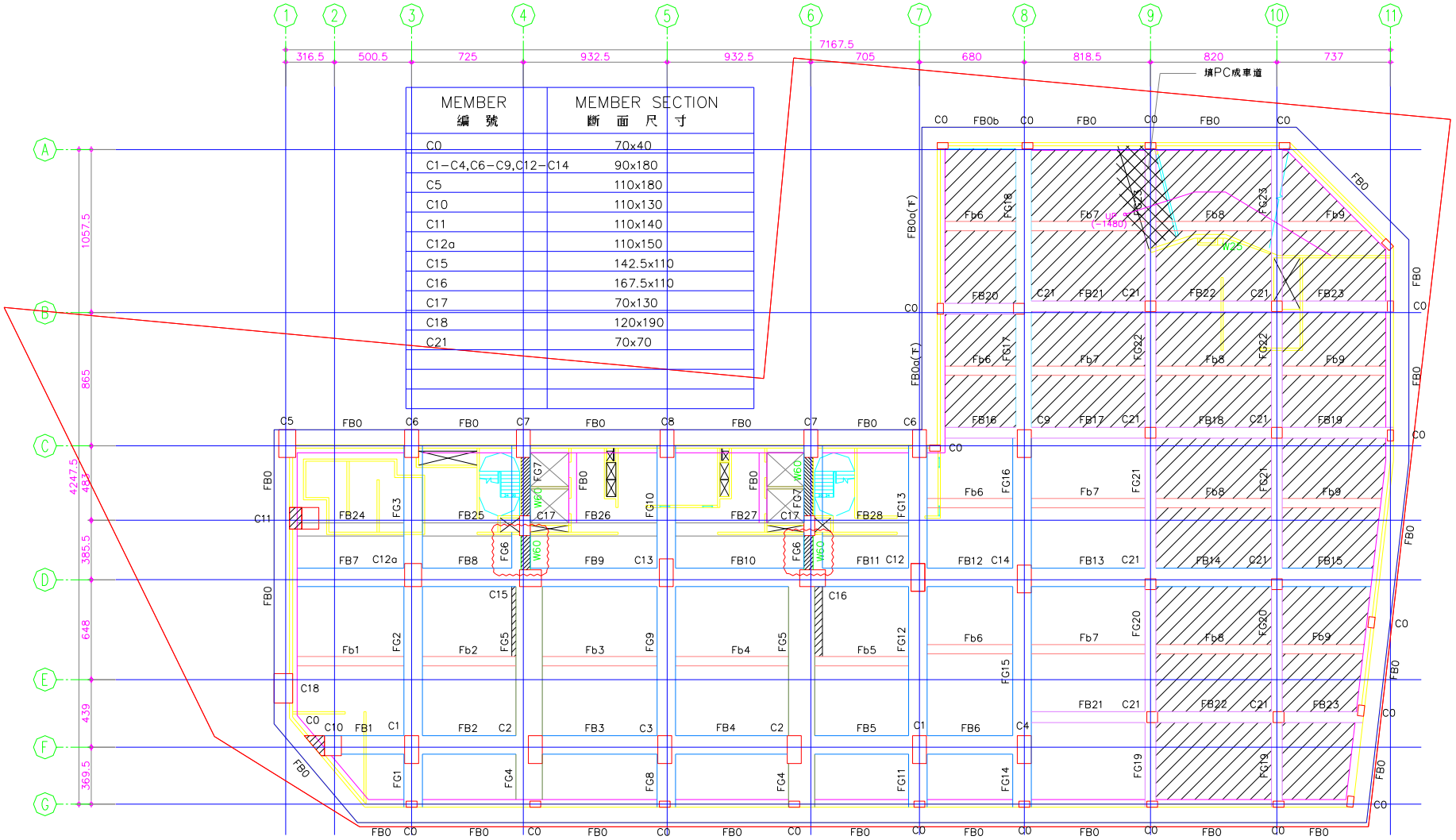
本基地位於新莊區 屬台北一區 (震度6=0.25G)

較台北二區增加 23 % 地震力



基礎平面

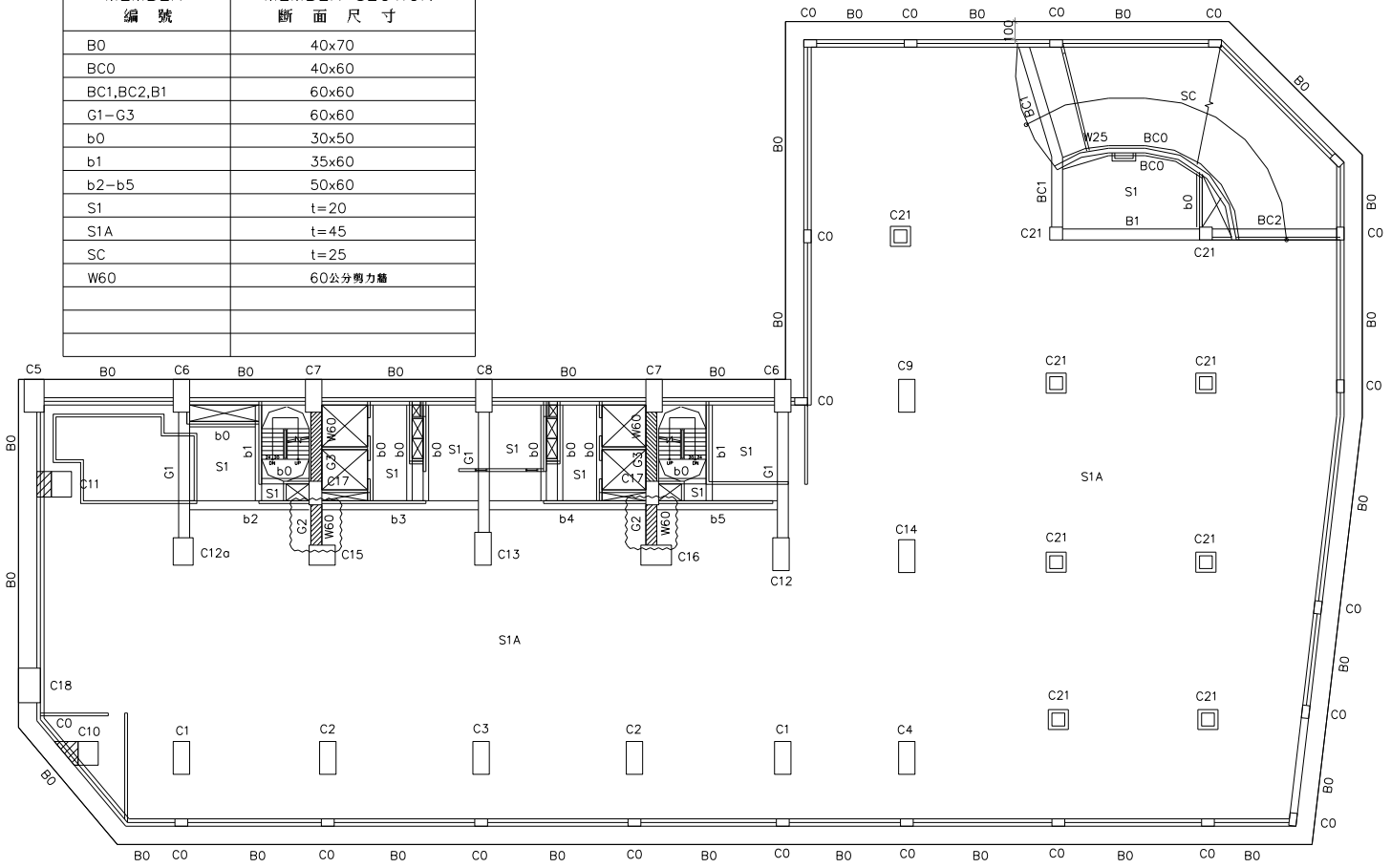
NEW STRUCTURE



B2F~B3F平面

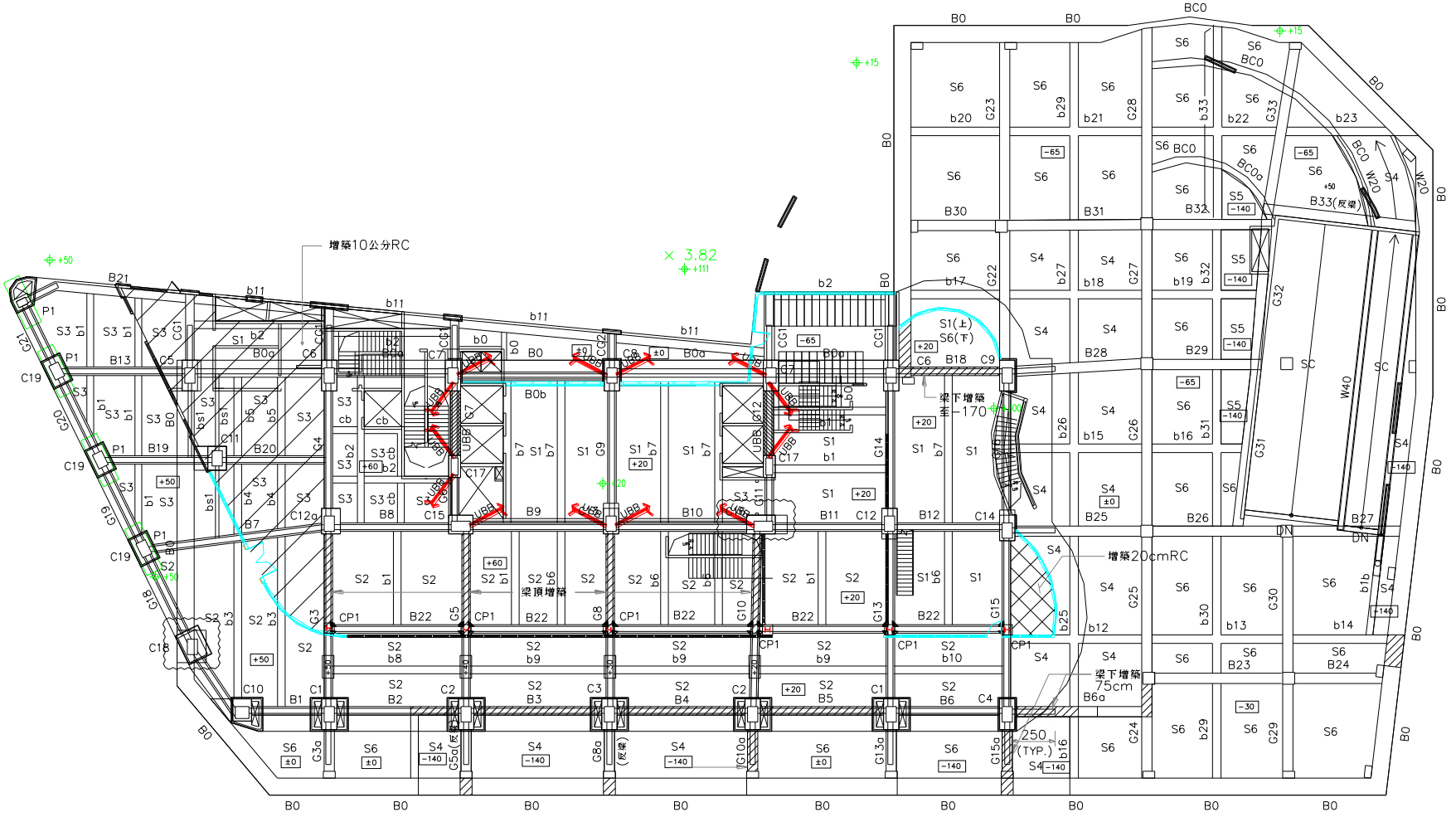
NEW STRUCTURE

MEMBER 編號	MEMBER SECTION 斷面尺寸
B0	40x70
BC0	40x60
BC1,BC2,B1	60x60
G1~G3	60x60
b0	30x50
b1	35x60
b2~b5	50x60
S1	t=20
S1A	t=45
SC	t=25
W60	60公分剪力牆



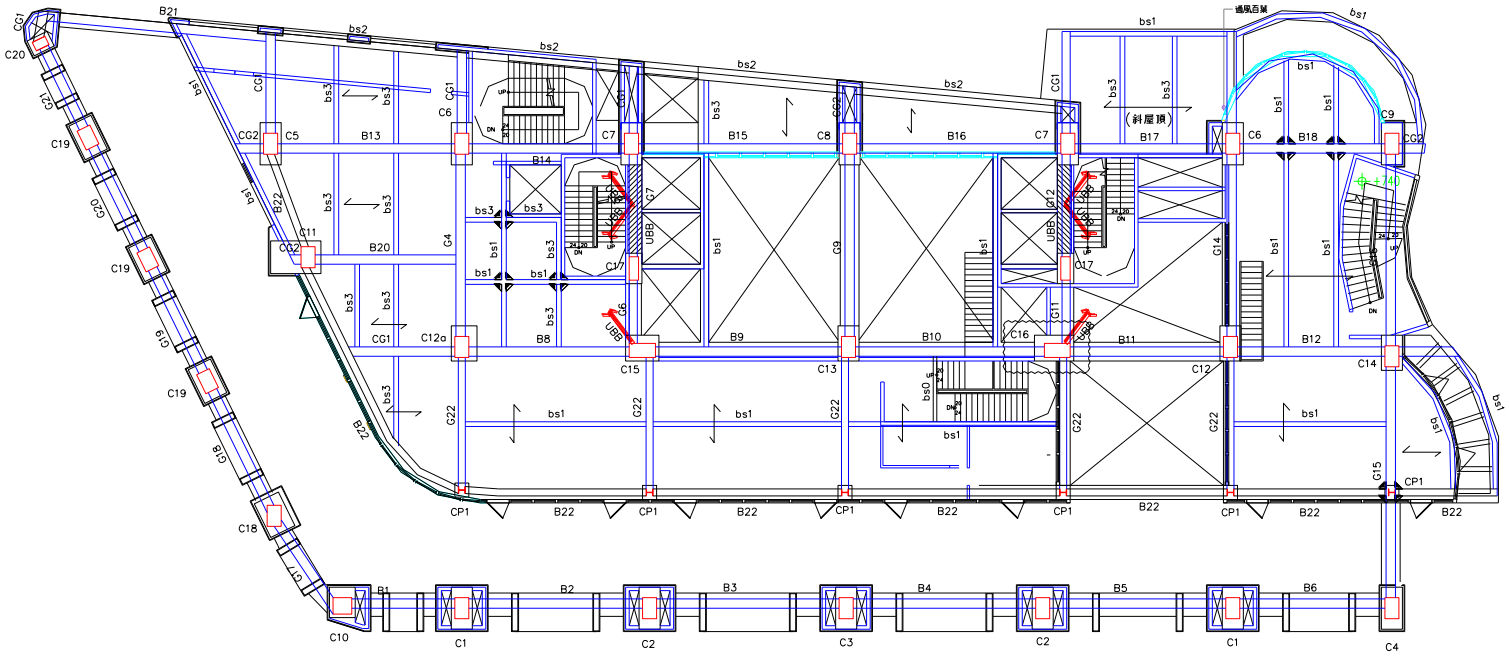
1F平面

NEW STRUCTURE



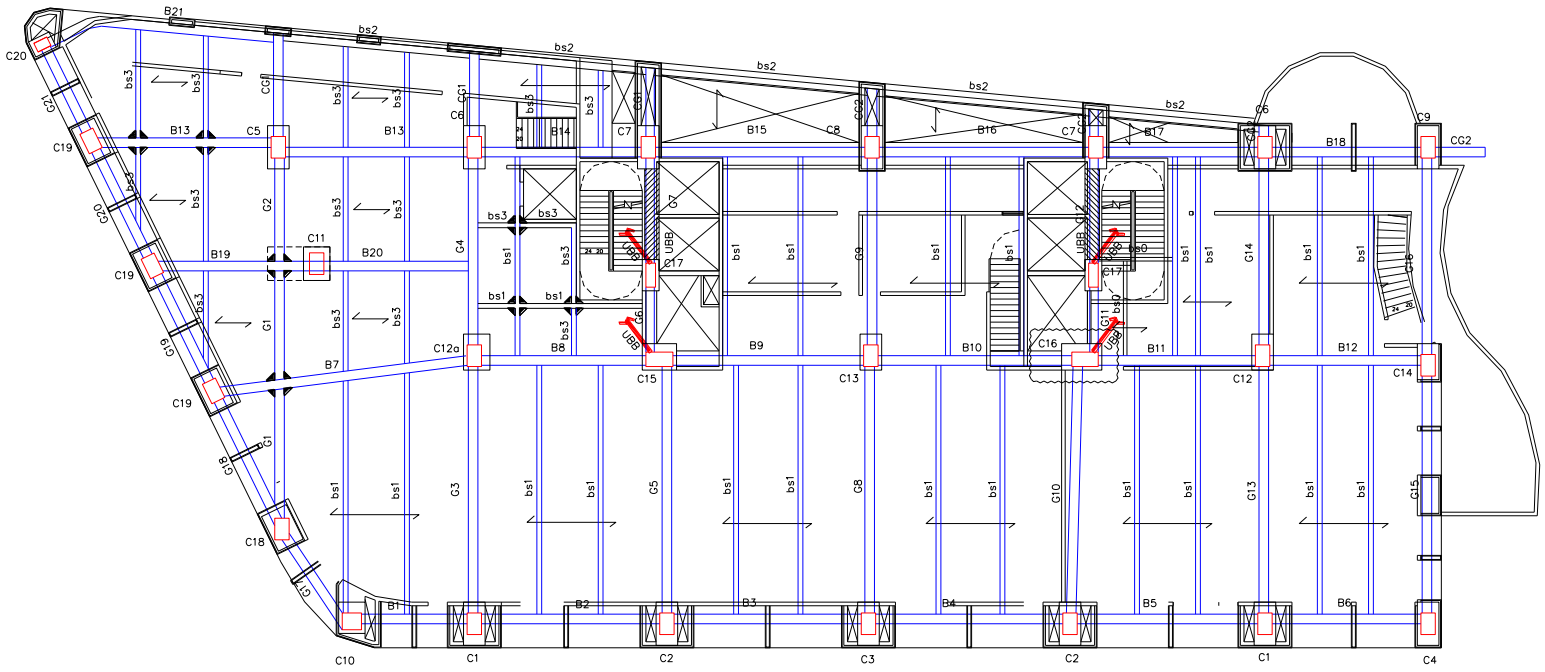
2F平面

NEW STRUCTURE



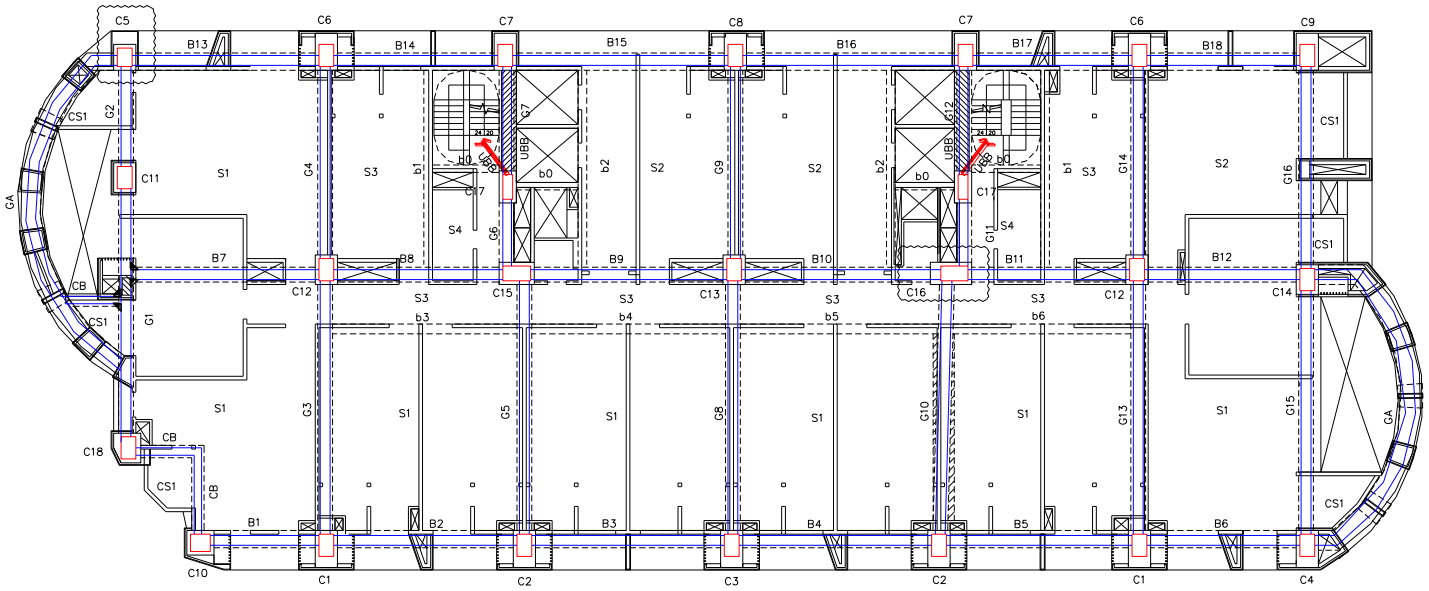
3F平面

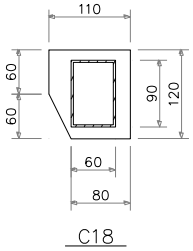
NEW STRUCTURE



5F,6F 平面

NEW STRUCTURE



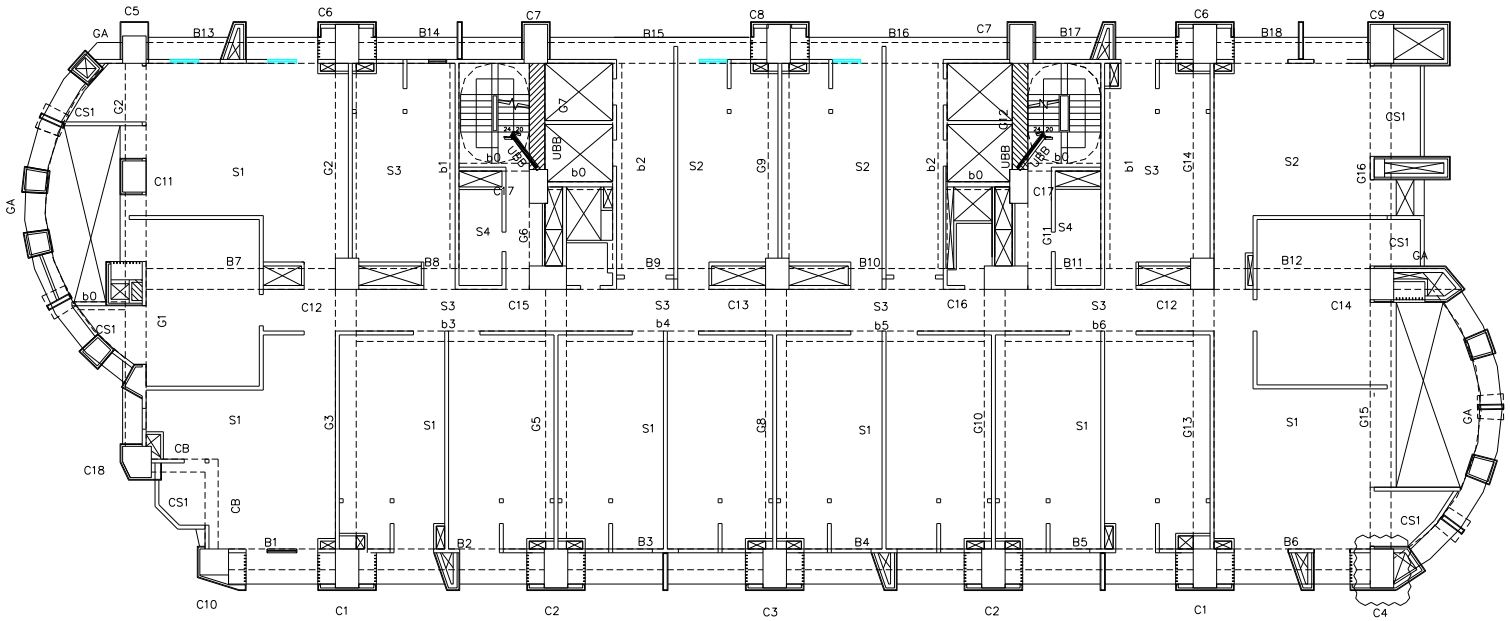


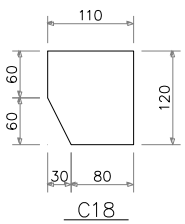
MEMBER 編號	MEMBER SECTION 斷面尺寸
C1-C4,C6-C9	□-60x90+90x150(SRC)
C5	□-60x75+90x105(SRC)
C10	□-80x70+110x100(SRC)
C11-C14	□-60x90+90x120(SRC)
C15	□-110x60+142.5x90(SRC)
C16	□-110x60+167.5x90(SRC)
C17	□-40x100+70x130(SRC)

MEMBER 編號	MEMBER SECTION 斷面尺寸
B1-B6,B13-B18	H-70x40+70x90(SRC)
B7-B12	H-55x40+60x75(SRC)
GA	H-55x40+80x80(SRC)
G1-G2,G15,G16	H-70x40+60x90(SRC)
G3-G5,G8-G10,G13,G14	H55x40+60x75(SRC)
G6,G7,G11,G12	H-70x35+60x90(SRC)
CB	H-55x30+50x75(SRC)
b0	30x50
b1-b2	35x60
b3-b6	40x65
S1-S4,CS1	t=20

標準層平面

NEW STRUCTURE



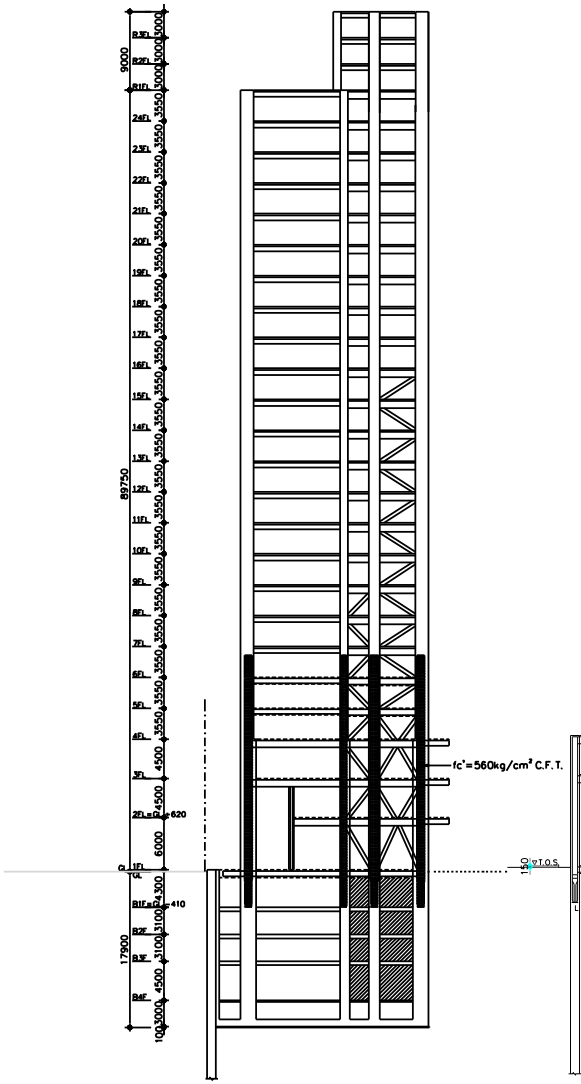


MEMBER 編號	MEMBER SECTION 斷面尺寸
C1–C4,C6–C9	90x150
C5	90x105
C10	110x100
C11–C14	90x120
C15	142.5x90
C16	167.5x90
C17	70x130

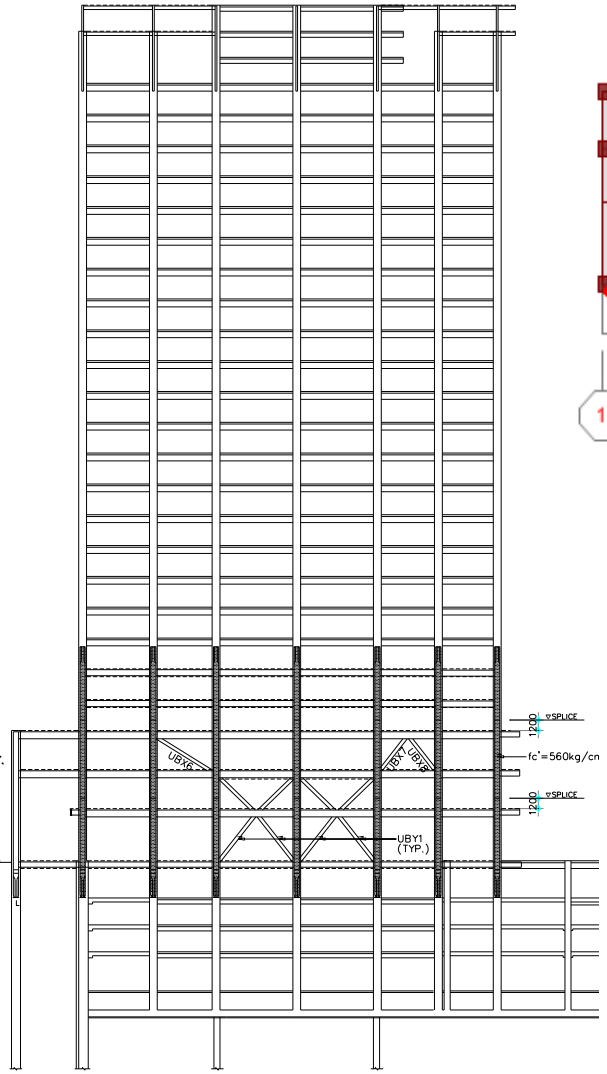
MEMBER 編號	MEMBER SECTION 斷面尺寸
B1–B6,B13–B18	80x90
B7–B12	80x75
CB	50x75
GA	80x80
G1–G2	80x100
G3,G5,G8,G10,G13,G14	80x75
G4,G9	80x90
G6,G7,G11,G12	60x100
G15,G16	80x80
b0	30x50
b1–b2	35x60
b3–b6	40x65
S1–S4,CS1	t=20

構造型式

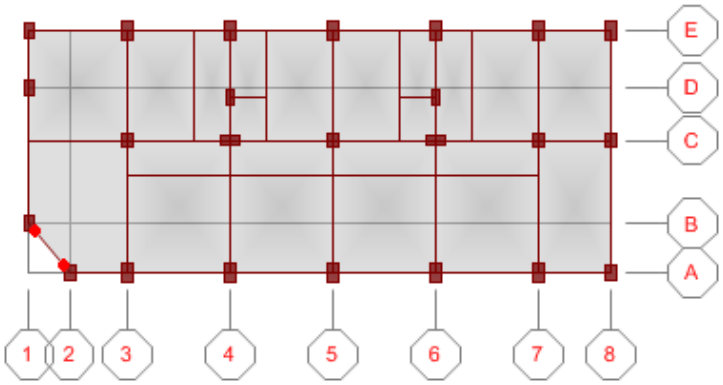
NEW STRUCTURE

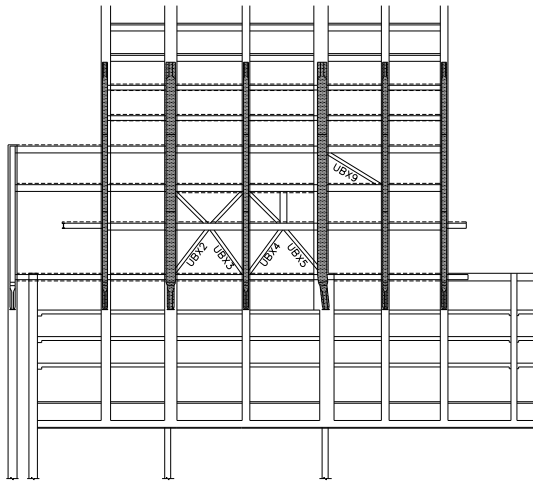


4,6 軸構架



C 軸構架

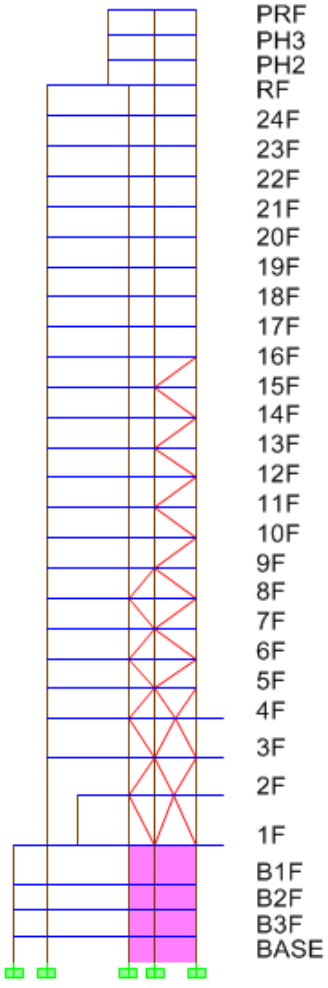




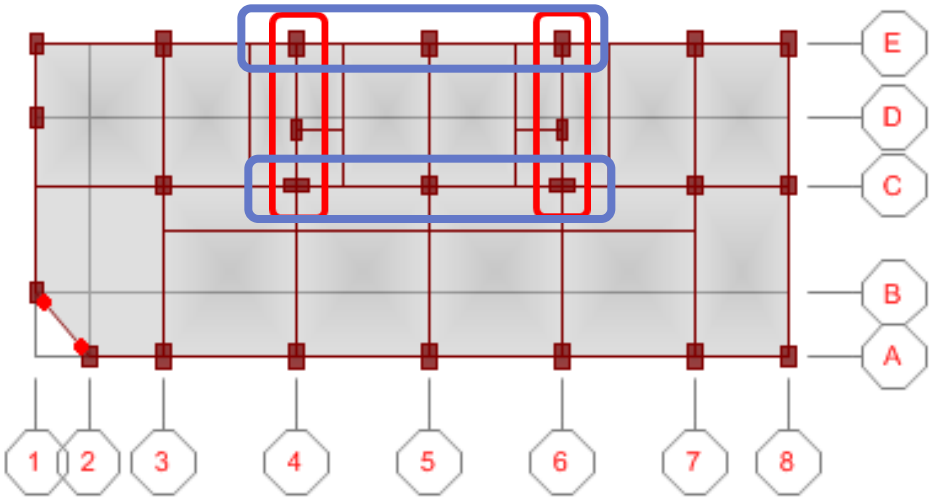
D 軸構架

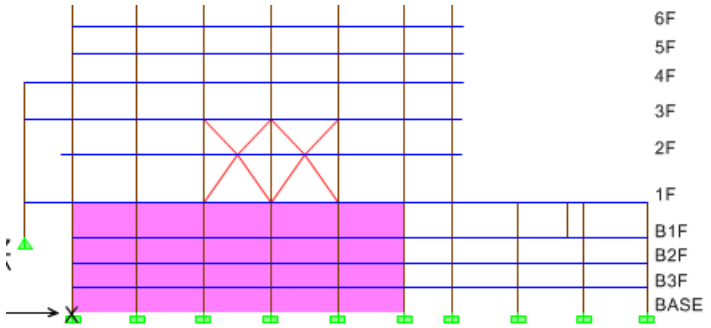
斜撐配置

NEW STRUCTURE



4、6

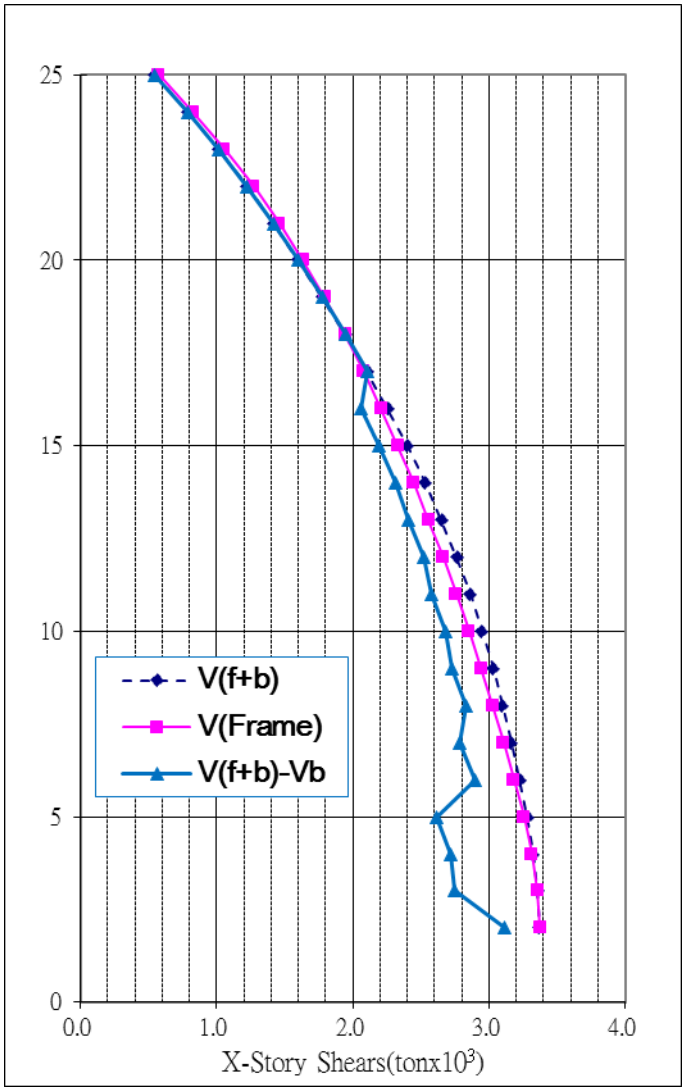


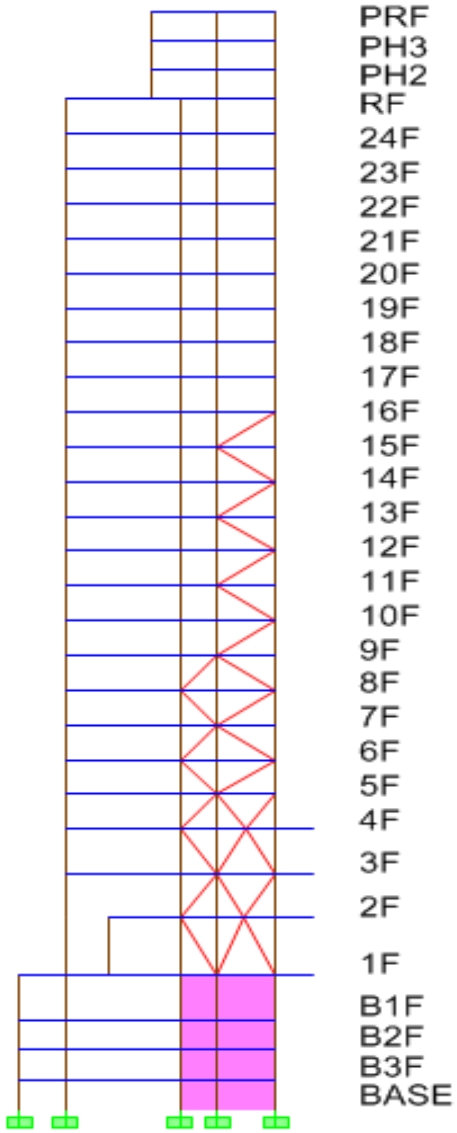


C、E

短向構架剪力比較

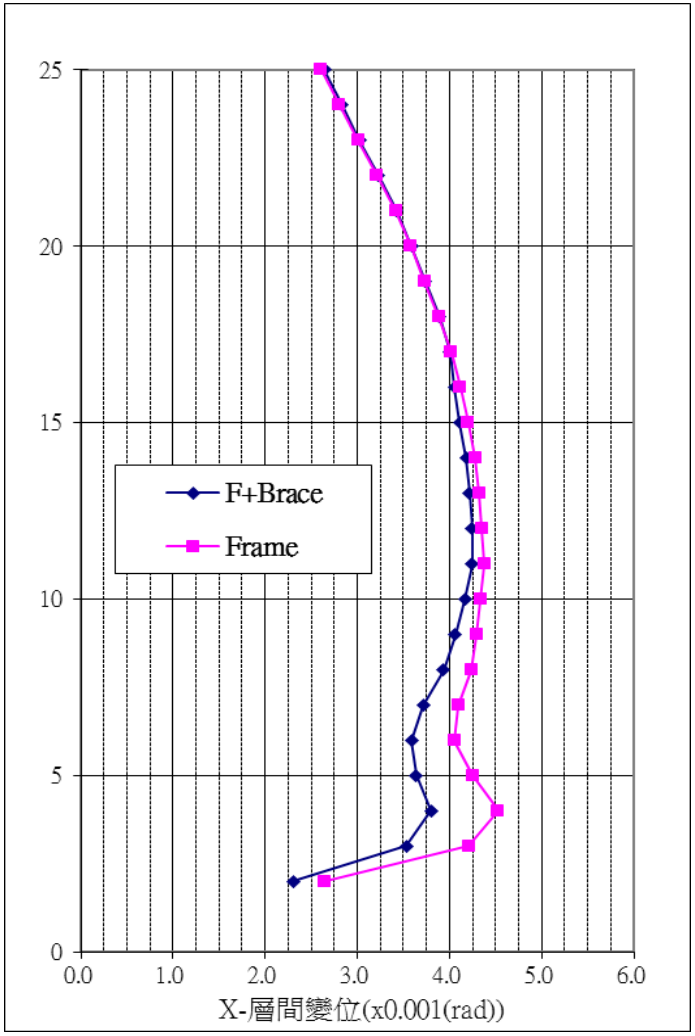
NEW STRUCTURE

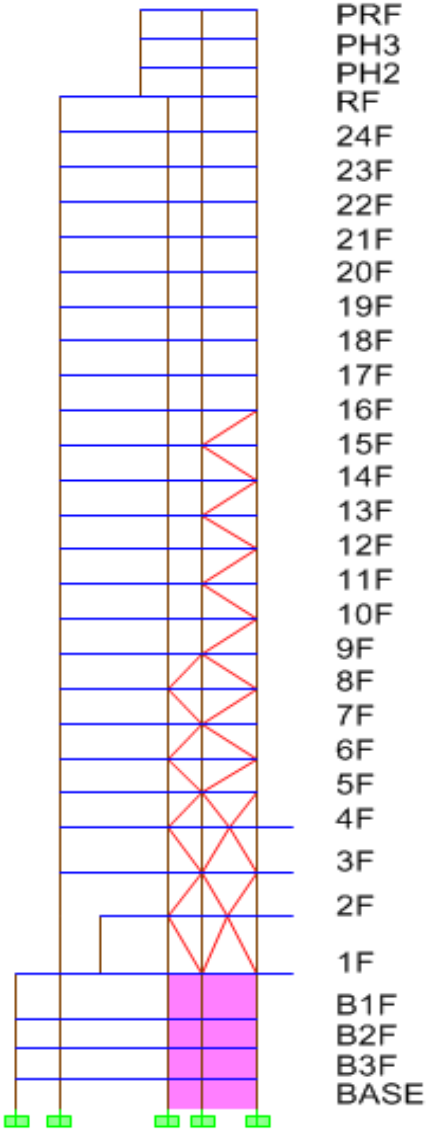




短向層間位移角比較

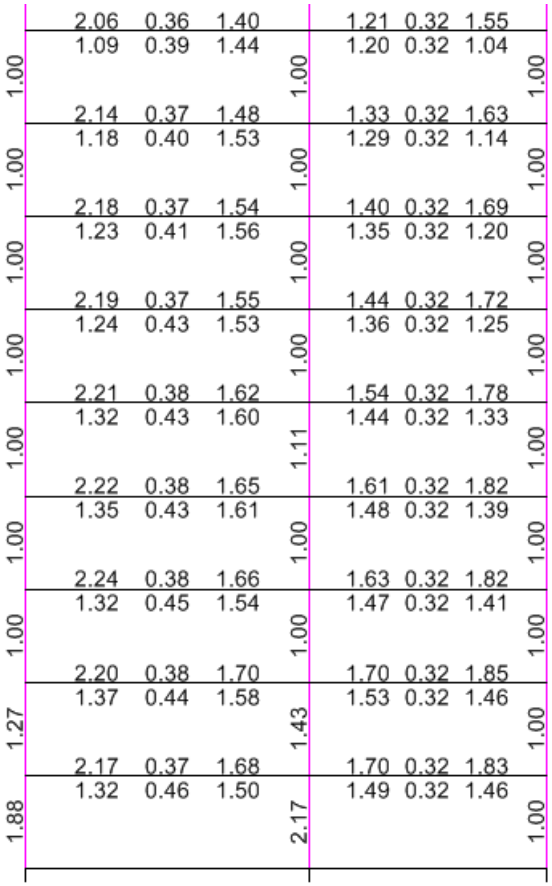
NEW STRUCTURE



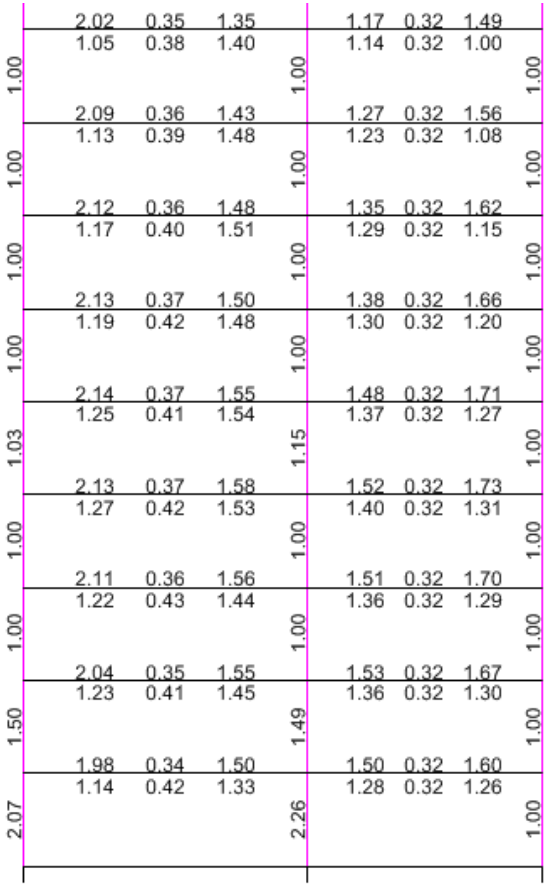


短向構架配筋比較

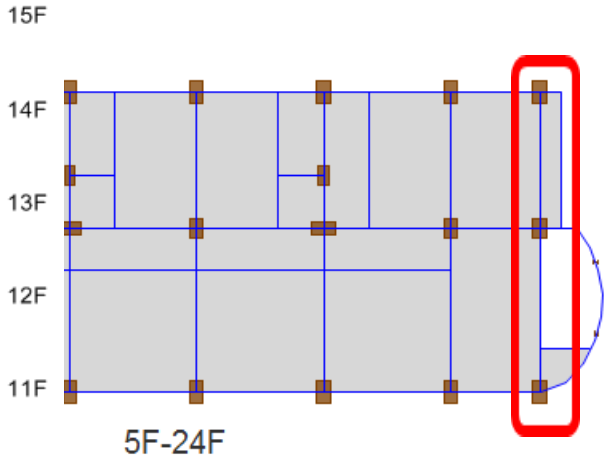
NEW STRUCTURE



空構架

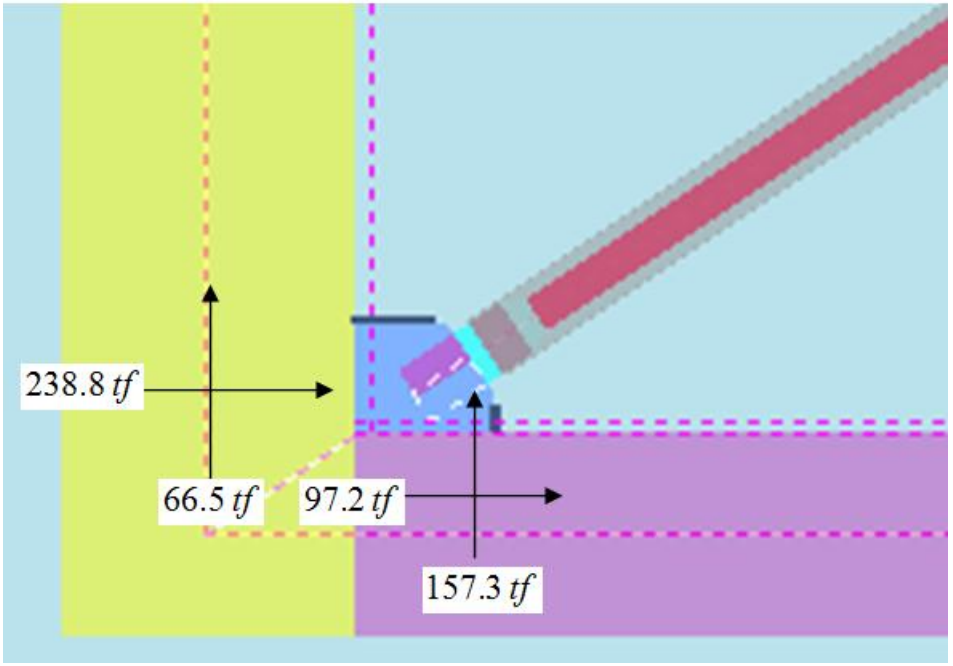


斜撐構架



斜撐接合設計

NEW STRUCTURE



The gusset-to-column force induced by brace axial force:

Horizontal force: Huc = Pmax*ec*sin(φ)/(eb+βU) = 238.8tonf

Vertical force: Vuc = Pmax*sin(φ) - Vub = 66.5tonf

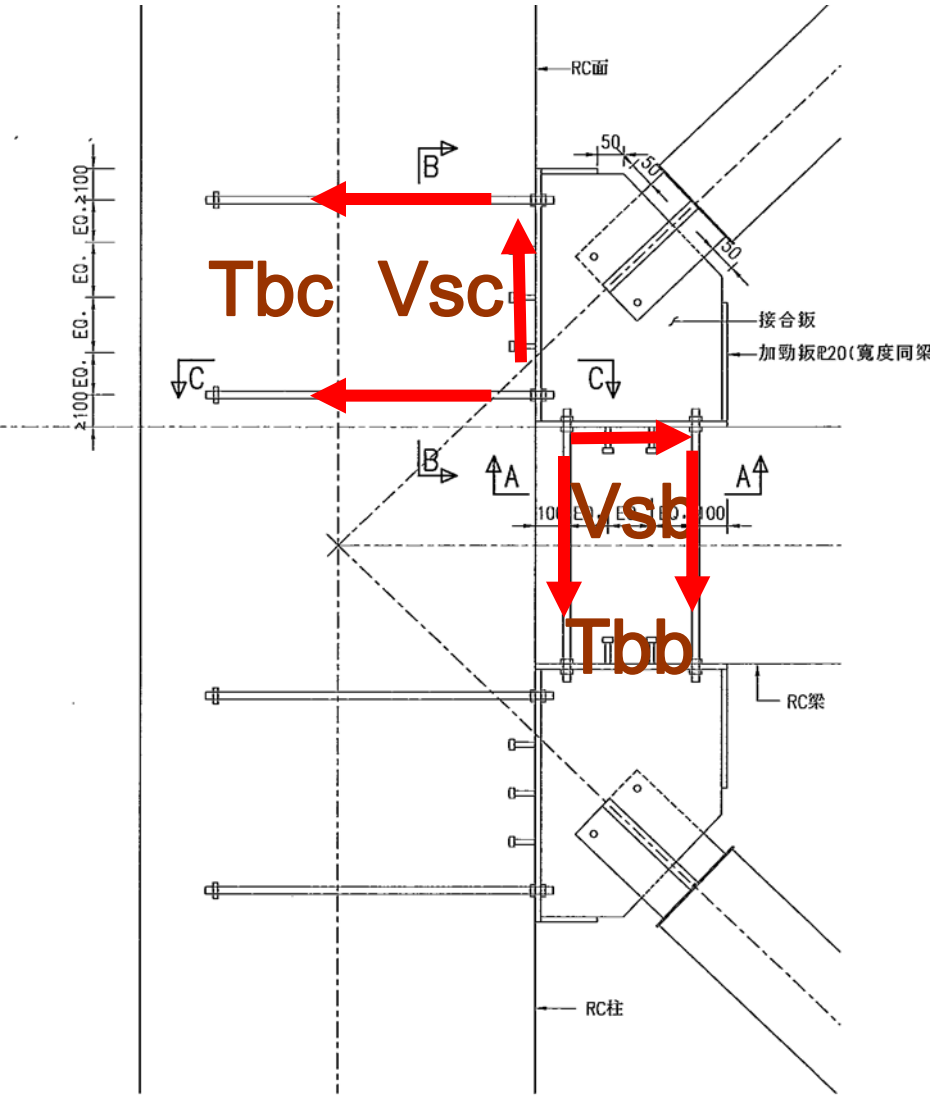
The gusset-to-beam force induced by brace axial force:

Horizontal force: Hub = Pmax*cos(φ) - Huc = 97.2tonf

Vertical force: Vub = Pmax*(eb*(cos(φ)*(eb+βU)-ec*sin(φ)))/αU/(eb+βU) = 157.3tonf

斜撐接合設計

NEW STRUCTURE



柱端 Tbc>Huc

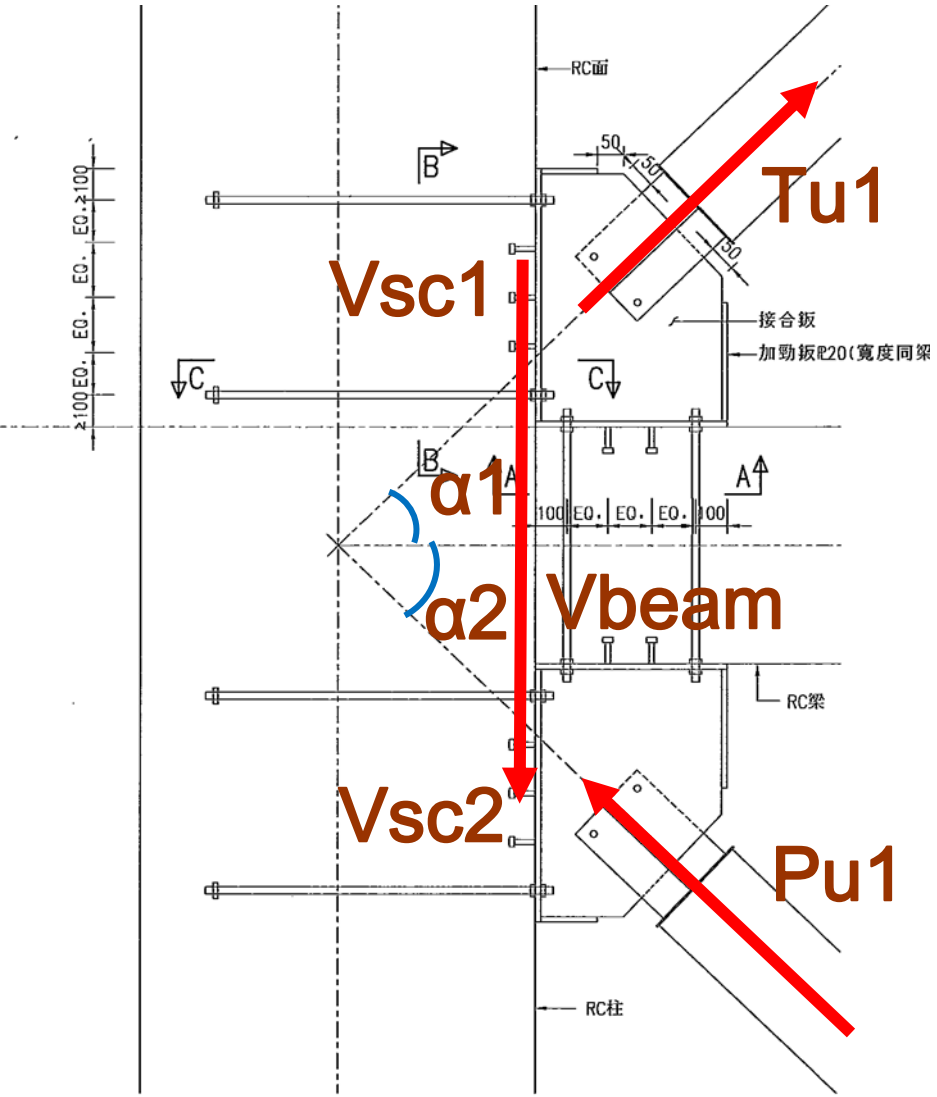
Vsc>Vuc

梁端 Tbb>Vub

Vsb>Hub

斜撐接合設計

NEW STRUCTURE



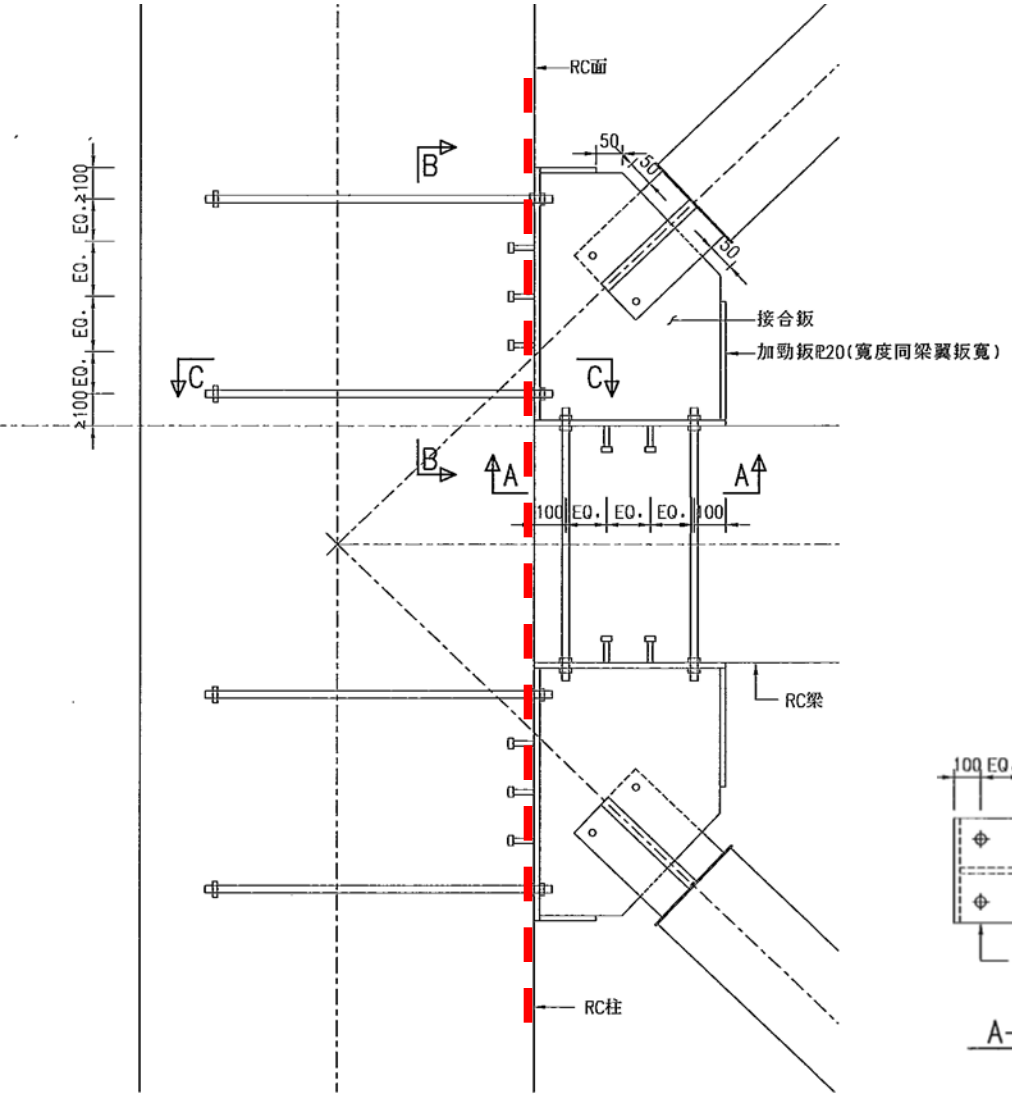
梁柱接合面

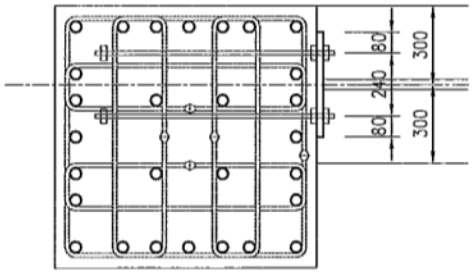
Vsc1+Vsc2+Vbeam

>Tu1x sinα1+ Tu1x sinα2

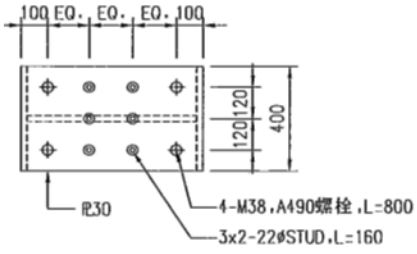
斜撐接合設計

NEW STRUCTURE

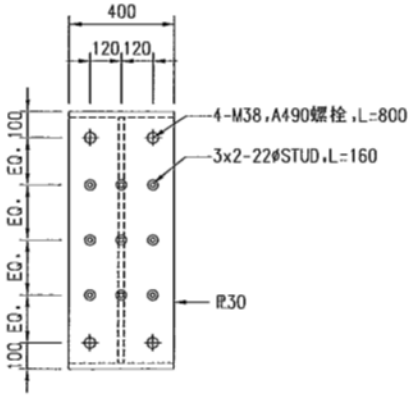




C-C剖面



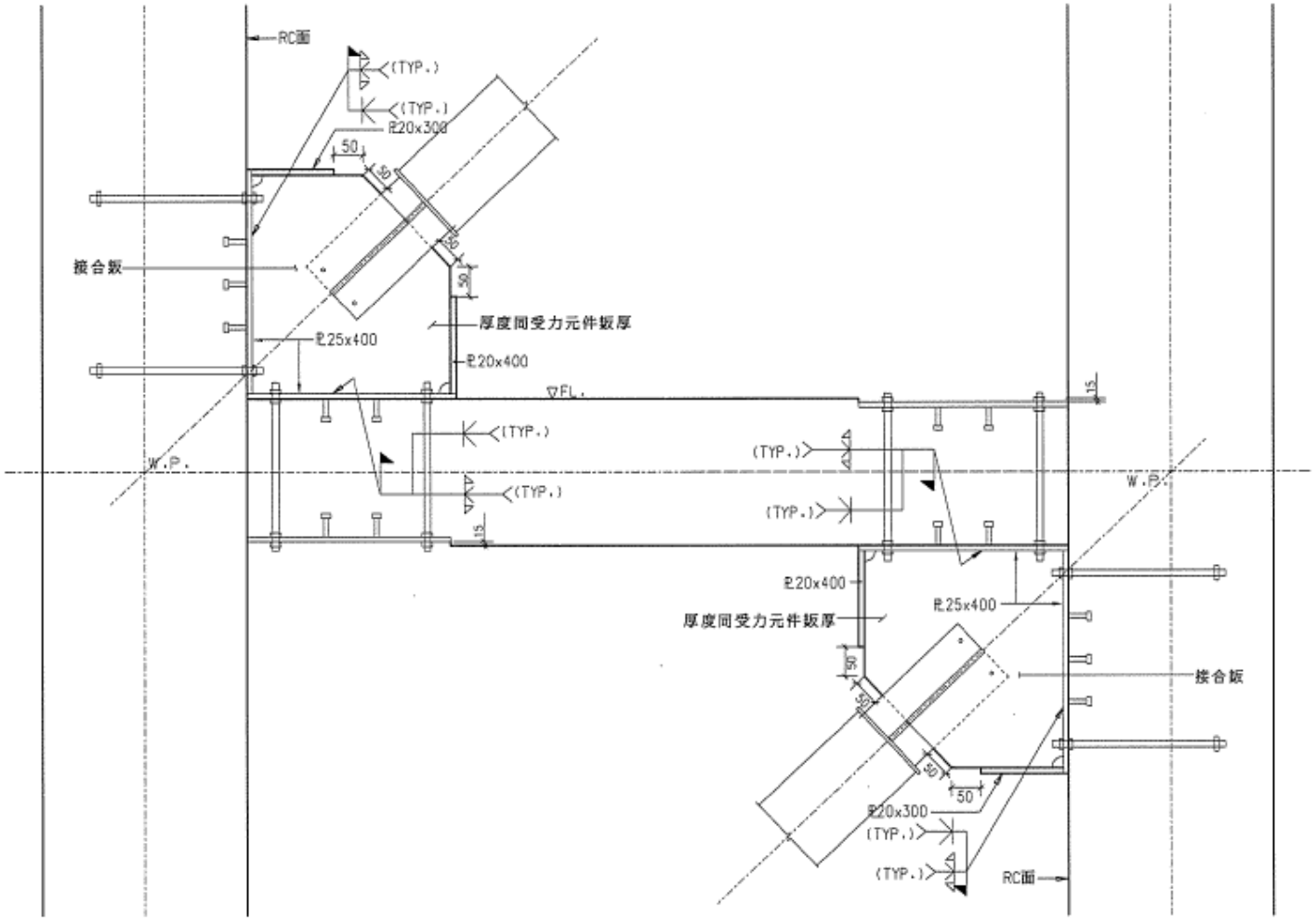
A-A剖面



B-B剖面

斜撐接合設計

NEW STRUCTURE



斜撑接合安装施工案例

NEW STRUCTURE

NEW STRUCTURE

謝謝指教