

Q1

考慮耐震特別規定的RC設計REBAR DETAIL問題，
當我進行RC BEAM CHECK時，RESULT按STRENGTH輸出時，看不到任何NG，如下所示：

TWN-USD112 RC-Beam Checking Result Dialog

Code : TWN-USD112

Unit : tonf , m

Primary Sorting Option

Sorted by

Member

Property

Results

Strength

Rebar Detail

SECT

MEMB

MEMB	SECT	Section		fc	POS	CHK	Negative Moment Strength					Positive Moment Strength					Shear Strength					Torsion Strength						
		Bc	Hc				fy	Rebar	As.use	N(-) Mu	LCB	N(-) φMn	Rat-N	Rebar	As.use	P(+) Mu	LCB	P(+) φMn	Rat-P	Stirrup	Vu	LCB	φVc	Rat-V	Skin-Bar	Tu	LCB	φTn
Span		bf	hf	fys																								
0	3	2G1		2800.00	I	OK	6-D25	0.0030	31.7787	24	35.4246	0.90	6-D25	0.0030	26.8221	44	35.4246	0.76	4-D16 @100	33.5853	38	0.00000	0.90	-	0.52846	30	12.4132	0.04
3		0.400	0.400	42000.0	M	OK	6-D25	0.0030	14.8380	46	35.4246	0.42	6-D25	0.0030	15.1845	26	35.4246	0.43	4-D16 @100	31.9978	38	9.31203	0.69	-	0.52846	30	12.4132	0.04
3.5000		0.000	0.000	42000.0	J	OK	6-D25	0.0030	32.5721	9	35.4246	0.92	6-D25	0.0030	27.7280	61	35.4246	0.78	4-D16 @100	33.9586	38	0.00000	0.91	-	0.52846	30	12.4132	0.04
0	4	3G1		2800.00	I	OK	6-D25	0.0030	30.8810	24	35.4246	0.87	6-D25	0.0030	24.0701	44	35.4246	0.68	4-D16 @100	35.9656	38	0.00000	0.97	-	0.35009	30	12.4132	0.03
4		0.400	0.400	42000.0	M	OK	6-D25	0.0030	13.3700	46	35.4246	0.38	6-D25	0.0030	13.8789	26	35.4246	0.39	4-D16 @100	33.4749	38	9.31203	0.72	-	0.35009	30	12.4132	0.03
3.5000		0.000	0.000	42000.0	J	OK	6-D25	0.0030	31.7482	7	35.4246	0.90	6-D25	0.0030	24.1833	61	35.4246	0.68	4-D16 @100	36.6418	38	0.00000	0.98	-	0.35009	30	12.4132	0.03
0	5	RG1		2800.00	I	OK	5-D25	0.0025	22.4519	24	29.7347	0.76	5-D25	0.0025	17.7256	44	29.7347	0.60	2-D16 @100	29.4442	38	0.00000	0.79	-	0.47663	30	12.4132	0.04
5		0.400	0.400	42000.0	M	OK	5-D25	0.0025	10.0497	8	29.7347	0.34	5-D25	0.0025	10.3566	26	29.7347	0.35	2-D16 @100	27.3277	38	9.31203	0.59	-	0.47663	30	12.4132	0.04
3.5000		0.000	0.000	42000.0	J	OK	5-D25	0.0025	23.0456	7	29.7347	0.78	5-D25	0.0025	17.8654	61	29.7347	0.60	2-D16 @100	29.5199	38	0.00000	0.79	-	0.47663	30	12.4132	0.04
0	8	2g1		2800.00	I	OK	3-2-D25	0.0025	34.2047	2	36.3380	0.94	2-D25	0.0010	9.32968	7	17.2374	0.54	2-D13 @210	20.1980	2	8.57717	0.81	-	0.03929	66	3.37813	0.01
8		0.300	0.500	42000.0	M	OK	2-D22	0.0008	11.3530	7	12.4966	0.91	3-D25	0.0015	20.5430	2	23.7017	0.87	2-D13 @220	13.9955	2	8.05209	0.57	-	0.03929	66	3.20103	0.01
9.0000		0.000	0.000	42000.0	J	OK	4-2-D22	0.0023	33.0960	7	34.2367	0.97	3-D25	0.0015	19.1994	2	24.2512	0.79	2-D13 @210	18.6116	2	8.66551	0.74	-	0.03929	66	3.35346	0.01
0	9	3g1		2800.00	I	OK	3-2-D25	0.0025	34.2623	2	36.4373	0.94	3-2-D22	0.0019	24.1610	2	28.8777	0.84	2-D13 @210	20.2051	2	8.57717	0.81	-	0.04537	66	3.37813	0.01
9		0.300	0.500	42000.0	M	OK	2-D22	0.0008	10.9809	7	13.4379	0.82	3-2-D22	0.0019	25.8742	2	28.3139	0.91	2-D13 @210	15.5486	2	8.47809	0.62	-	0.04537	66	3.30839	0.01

Connect Model View

Select AllUnselect AllRe-calculation

Graphic...Detail...Summary...<<

Option for Detail Print Position

End I.

Mid.

End J.

Close

Result View Option

All

OK

NG

Copy Table

但按REBAR DETAIL輸出時，卻出現下列NG情形，且我目前在官方網站暫時找不到相關說明檔案：

TWN-USD112 RC-Beam Checking Result Dialog

Code : TWN-USD112

Unit : tonf , m

Primary Sorting Option

Sorted by

Member

Property

Results

Strength

Rebar Detail

SECT

MEMB

MEMB	SECT	Section		fc	POS	CHK	Main Rebar (Top)					Main Rebar (Bottom)					Stirrup				Skin-Bar	
		Bc	Hc				fy	p.max (%)	p.use (%)	p.min (%)	s.max	s.use	p.max (%)	p.use (%)	p.min (%)	s.max	s.use	Av.use	Av.min	s.max	s.use	s.max
Span		bf	hf	fys																		
0		2G1		2800.00	I	V	3.966	2.173	0.333	0.2868	0.0600	3.966	2.173	0.333	0.2868	0.0600	0.0001	0.0000	0.0875	0.1000	-	-
3		0.400	0.400	42000.0	M	V	3.966	2.173	0.333	0.2868	0.0600	3.966	2.173	0.333	0.2868	0.0600	0.0001	0.0000	0.0875	0.1000	-	-
3.5000		0.000	0.000	42000.0	J	V	3.966	2.173	0.333	0.2868	0.0600	3.966	2.173	0.333	0.2868	0.0600	0.0001	0.0000	0.0875	0.1000	-	-
0		3G1		2800.00	I	V	3.966	2.173	0.333	0.2868	0.0600	3.966	2.173	0.333	0.2868	0.0600	0.0001	0.0000	0.0875	0.1000	-	-
4		0.400	0.400	42000.0	M	V	3.966	2.173	0.333	0.2868	0.0600	3.966	2.173	0.333	0.2868	0.0600	0.0001	0.0000	0.0875	0.1000	-	-
3.5000		0.000	0.000	42000.0	J	V	3.966	2.173	0.333	0.2868	0.0600	3.966	2.173	0.333	0.2868	0.0600	0.0001	0.0000	0.0875	0.1000	-	-
0		RG1		2800.00	I	V	3.604	1.811	0.333	0.2868	0.0750	3.604	1.811	0.333	0.2868	0.0750	0.0000	0.0000	0.0875	0.1000	-	-
5		0.400	0.400	42000.0	M	OK	3.604	1.811	0.333	0.2868	0.0750	3.604	1.811	0.333	0.2868	0.0750	0.0000	0.0000	0.1750	0.1000	-	-
3.5000		0.000	0.000	42000.0	J	V	3.604	1.811	0.333	0.2868	0.0750	3.604	1.811	0.333	0.2868	0.0750	0.0000	0.0000	0.0875	0.1000	-	-
0		2g1		2800.00	I	OK	2.579	1.966	0.333	0.2868	0.1000	3.671	0.751	0.333	0.2868	0.2000	0.0000	0.0000	0.2149	0.2100	-	-
8		0.300	0.500	42000.0	M	OK	2.920	0.573	0.333	0.2828	0.2000	2.366	1.127	0.333	0.2868	0.1000	0.0000	0.0000	0.2250	0.2200	-	-
9.0000		0.000	0.000	42000.0	J	OK	2.961	1.782	0.333	0.2828	0.0667	3.513	1.127	0.333	0.2868	0.1000	0.0000	0.0000	0.2171	0.2100	-	-
0		3g1		2800.00	I	OK	3.294	1.966	0.333	0.2868	0.1000	3.753	1.496	0.333	0.2828	0.1000	0.0000	0.0000	0.2149	0.2100	-	-
9		0.300	0.500	42000.0	M	OK	3.226	0.573	0.333	0.2828	0.2000	2.392	1.496	0.333	0.2828	0.1000	0.0000	0.0000	0.2156	0.2100	-	-

Connect Model View

Select All

Unselect All

Re-calculation

Graphic...

Detail...

Summary...

<<

Result View Option

All

OK

NG

Option for Detail Print Position

End 1.

Mid.

End 3.

Close

Copy Table



在Rebar Detail 您會發現NG比如2G1 斷面，在Detail report 是因為這個Smax,code控制，通常可以增加梁的深度尺寸。

$$S_{max,calc} = Leg * \frac{A_{sv1}}{A_{v,calc}} = 0.268m$$

$$(l \leq l_0 = 0.800m) \therefore \text{Dense Zone}$$

$$S_{max,code} = \min(d/4, 6 d_b, 15.0cm) = 0.0875m$$

$$S_{max} = \min(S_{max,calc}, S_{max,code}) = 0.0875m$$

$$S_{use} = 0.100m > S_{max} = 0.0875m \rightarrow \text{Not Acceptable}$$

Calculate required shear strength by transverse reinforcement

另外，如果做RC Beam Design為2G1 斷面，程式會使用8 cm 而不是 10 cm（如下圖）。

TWN-USD112 RC-Beam Design Result Dialog

Code : TWN-USD112

Unit : tonf , m

Primary Sorting Option

☐ SECT

☒ MEMB

Beam Design

Sorted by

☐ Member

☒ Property

MEMB	SEL	Section		fc	POS	N(-) Mu	LCB	AsTop	Rebar	P(+) Mu	LCB	AsBot	Rebar	Vu	LCB	AsV	Stirrup	Tu	LCB	AsL	AsT
SECT		Bc	Hc	fy																	
Span		bf	hf	fys																	
0	☐	2G1		2800.00	I	31.7787	24	0.0028	6-D25	26.8221	44	0.0024	6-D22	31.1653	38	0.0028	2-D13 @80	0.52846	30	0.0000	0.0000
3		0.400	0.400	42000.0	M	14.8380	46	0.0012	3-D25	15.1845	26	0.0012	3-D25	29.5777	38	0.0019	2-D13 @80	0.52846	30	0.0000	0.0000
3.5000		0.000	0.000	42000.0	J	32.5721	9	0.0029	6-D25	27.7280	61	0.0025	5-D25	31.5385	38	0.0029	2-D13 @80	0.52846	30	0.0000	0.0000

Update rebar 之後再執行Beam Check就沒問題（如下圖）

Beam Checking Result的Strength是強度要求，Rebar Detail是規範鋼筋條款檢核
所以您目前採用10cm 可以符合Strength 要求，但是不符合規範 18.3.4.4 的鋼筋間距要求。

TWN-USD112 RC-Beam Checking Result Dialog

Code : TWN-USD112

Unit : tonf , m

Primary Sorting Option

Beam Check

Sorted by

☐ Member
☒ Property

Results

☒ Strength
☐ Rebar Detail

☐ SECT
☒ MEMB

MEMB	SEL	Section		fc	POS	CHK	Negative Moment Strength					Positive Moment Strength					Shear Strength					Torsion Strength						
SECT		Bc	Hc	fy			Rebar	As.use	N(-) Mu	LCB	N(-) φMn	Rat-N	Rebar	As.use	P(+) Mu	LCB	P(+) φMn	Rat-P	Stirrup	Vu	LCB	φVc	Rat-V	Skin-Bar	Tu	LCB	φTn	Rat-T
Span		bf	hf	fys																								
0		2G1		2800.00	I	OK	6-D25	0.0030	31.7787	24	35.2987	0.90	6-D22	0.0023	26.8221	44	27.3755	0.98	2-D13 @80	31.1653	38	0.00000	0.89	-	0.52846	30	9.71770	0.05
3	☐	0.400	0.400	42000.0	M	OK	3-D25	0.0015	14.8380	46	18.3168	0.81	3-D25	0.0015	15.1845	26	18.3168	0.83	2-D13 @80	29.5777	38	8.24970	0.68	-	0.52846	30	9.71770	0.05
3.5000		0.000	0.000	42000.0	J	OK	6-D25	0.0030	32.5721	9	35.3428	0.92	5-D25	0.0025	27.7280	61	29.7700	0.93	2-D13 @80	31.5385	38	0.00000	0.90	-	0.52846	30	9.71770	0.05

TWN-USD112 RC-Beam Checking Result Dialog

Code : TWN-USD112

Unit : tonf , m

Primary Sorting Option

Sorted by

☐ Member

☒ Property

Results

☐ Strength

☒ Rebar Detail

☐ SECT

☒ MEMB

Beam Check

MEMB	SEL	Section		fc	POS	CHK	Main Rebar (Top)					Main Rebar (Bottom)					Stirrup				Skin-Bar	
SECT		Bc	Hc	fy			p.max (%)	p.use (%)	p.min (%)	s.max	s.use	p.max (%)	p.use (%)	p.min (%)	s.max	s.use	Av.use	Av.min	s.max	s.use	s.max	s.use
Span		bf	hf	fys																		
0		2G1		2800.00	I	OK	3.452	2.173	0.333	0.2868	0.0600	3.966	1.659	0.333	0.2828	0.0600	0.0000	0.0000	0.0875	0.0800	-	-
3	☐	0.400	0.400	42000.0	M	OK	2.879	1.086	0.333	0.2868	0.1500	2.879	1.086	0.333	0.2868	0.1500	0.0000	0.0000	0.0875	0.0800	-	-
3.5000		0.000	0.000	42000.0	J	OK	3.604	2.173	0.333	0.2868	0.0600	3.966	1.811	0.333	0.2868	0.0750	0.0000	0.0000	0.0875	0.0800	-	-