10th July 2017



Design Quintessence Pty Ltd Unit 25, 7-9 Percy Street Auburn NSW 2144

Attention: Mr Ian Wood

STRUCTURAL DESIGN CERTIFICATE

Project Description: Design Quintessence Boom Arms

We, Partridge Structural Pty Limited, being Professional Structural Engineers, within the meaning of the Building Code of Australia, hereby certify that we have carried out a design review of the proof load testing carried out on the Design Quintessence Boom Arms and confirm that the following working load limits may be assumed:

1.	50 x 4 1000 mm Boom Arm:	0.5 kN (50 kg)
2.	50 x 4 500 mm Boom Arm:	1.0 kN (100 kg)
З.	50 x 3 1000 mm Boom Arm:	0.5 kN (50 kg)
4.	50 x 3 500 mm Boom Arm:	0.5 kN (50 kg)

Assumptions:

- The values are based on the Load Test Reports provided by Global Truss, dated 22/06/2016 for items 1 to 3, dated 28/05/2015 for item 4 and are appended to this certificate.
- One load test was performed on each Design Quintessence Boom Arm. The capacity was derived by manipulating the results in accordance with the guidelines outlined in Section 8 of AS/NZS 1664.1-1997.
- These loads are to be considered as individual load cases and may not be combined
- This certification is to only be read in conjunction with all relevant technical drawings, including attached drawings 417/036 and 417/317 both dated 6/7/17, manuals, and the abovementioned Load Test Reports.

Prepared by:

Isaac Beton BE(Hons 1) BDesArch GradIEAust_ Design Engineer

For and on behalf of: <u>Partridge Structural Pty Limited</u>

Level 5, 1 Chandos Street, St Leonards NSW 2065 Australia t 612 9460 9000 e partridge@partridge.com.au

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Partridge Structural Pty Ltd – 73 002 451 925 Partridge Event Pty Ltd – 50 139 601 433 Partridge Remedial Pty Ltd – 89 145 990 521 Partridge Hydraulic Services Pty Ltd – 11 608 027 578 Reviewed by:

Tadd Walford BE(Hons) MIEAust Dip. PM Senior Engineer

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APPENDIX A LOAD TEST REPORTS





TEST REPORT FOR 1.0m(4mm) Boom Arm



Below picture for show the statement of the conditions of testing



Before apply a test load, distance between plate and the end of tube is 211.5mm

the test results for specimen as described above in the testing procedure pictures

1	1. 試件名稱	GT A-RIG-BM100/AMM
2	2. 標點距離	1.00 mm
4	3. 試件斷面形狀	4.不規則斷面
	a. 斷面面積	0.0000 mm*2
150		
109	4. 起始荷重	■1.000 kgf 起始荷重歸零 All Zero -
500	5. 最大荷重	₩37.50 kgf 📕 進階-報告顯示設定
0.0	6. 終點荷重	≸50.00 % ■ 進階測試條件設定
	7. 最大伸長	1500.00 mm 测試的歸擎 All Zero ✔
荷	8. 求取降伏點	係數選擇 a. 參考點 P1 b. 參考點 P2 c. 偏移比例
Graph	YES	楊氏保敷 ● 0.30 0.45 0.20 %
None		K值[點數] 15
20002	最大測試時間	1 資料儲存比例 HH MM SS 1 資料儲存比例



Apply a test load of 37.5kg



Distance is 198.75mm after loaded deformation of the specimen at five minutes



Distance is 210.6mm Unload the specimen

			H
	1. 試件名稱	GT A-RIG-BM100(4MM)	
3	2. 標點距離	1.00 mm	
	3. 試件斷面形狀	4.不規則斷面 🗸	
251	a. 斷面面積	#0.0000 mm*2	F
20.0			
15.0	4. 起始荷重	算1.000 kgf 起始荷重歸零 All Zero ✓	
10.6	5. 最大荷重	₩75.00 kgf 📕 進階·報告顯示設定	-
5.0	6. 終點荷重	第50.00 % ■ 進階 潮試條件 設定	7
	7. 最大伸長	對500.00 mm 測試前歸零 All Zero ₩	Ť.
	8. 求取降伏點	係數選擇 a. 參考點 P1 b. 參考點 P2 c. 偏移比例	1
	YES	楊氏保數 ▼ 0.30 0.45 0.20 %	
Graph		K値[點數] 第5	
@C002	最大測試時間	1 資料儲存比例 HH:MM:SS 1 資料儲存比例	
			2
Filelist			



Apply a test load of 75kg



Distance is 181.5mm after loaded deformation of the specimen at five minutes



Distance is 210.5mm Unload the specimen

	A C002			
A mar	TIM	🛦 Testing Set		
AL.	a a a a a a a a a a a a a a a a a a a	1.2 測試資	料設定 Print Help Update Exit	
	1	1. 試件名稱	GT A-RIG-BM100(4MM)	
	2	2. 標點距離	#1.00 mm	
	4	3. 試件斷面形狀	4.不規則斷面	
	30	a. 斷面面積	#0.0000 mm*2	F
	40			
	30	4. 起始荷重	↓1.000 kgf 起始荷重歸零 All Zero ¥	
	20	5. 最大荷重	#8000.00 kgf ■ 進階報告顯示設定	H
	0	6. 終點荷重	▲150.00 % 重進階·測調操件散定	1
		7. 最大伸長	●500.00 mm 例武印始巻 All 2010 ▼	
		商 8. 求取降伏點	係數選擇 a. 參考點 PI b. 參考點 P2 c. 偏移比例	
	Gran	YES AN	楊氏係數 0.30 0.45 0.20 / /	
	None		K(面繁白紫灯) 1 5	
	and a	最大測試時間	00:22:10 HH:MMSS	
	16			· ·
	Fileh	st		

Apply a test load of 8000kg , the tube broken once at 202.1kg.





The tube fracture at weld, others No obvious deformation

Testing Tables

Load Step	Load(N)	Loaded	Time	Pass/Fail	Unloaded
		Deformation(mm)	Held(s)		Deformation
1	375	12.75	300	Pass	No obvious
					deformation
2	750	30	300	Pass	No obvious
					deformation
Test until	80000	78.1	300	Fail	Tube fracture
failure					deformation

2016.06.22

TEST REPORT FOR 0.5m(4mm) Boom Arm



Below picture for show the statement of the conditions of testing



Before apply a test load, distance between plate and the end of tube is 190.9mm



the test results for specimen as described above in the testing procedure pictures

1000			
S.m.		A Testing Set	
-6-	71	1.2 測試資料設定 Print Help Update Ext	
1		1. 試件名稱 GT A-RIG-BM050(4MM) Copen	
	1	2. 标题占距离维	
a state	3	3. 試件斷面形狀 4.不規則斷面 🗸	
and the second	4	a. 斷面面積 <mark>#0.0000</mark> mm ⁻²	
	150		
	125	4. 起始荷重 11.000 kgf 起始荷重錦零 All Zero M	
	75.0	5. 最大荷重 175.00 kgf 重進階報告顯示設定	
Contract Co	50.0	6. 終點荷重 第50.00 % 重進降潮試條件設定	
	0.0	7. 最大伸長 1500.00 mm 溴試的路零 All Zero •	
		8. 求取降伏點 係數選擇 a. 參考點 PI b. 參考點 P2 c. 偏移比例	
	荷	YES 1855. 1885. 1 0.30 0.45 0.50 14	
	Graph	K值記题 3	
	None	最大割試時間 00:22:10 HHMM 1 1 HCM 100	

	C002-F 960323					
E.	PI ())		" 周以報告	₩ ■ 脚試存檔	s III Athu	駿諺精機
	50.0 70.0		1.讀取_ 2.單筆_ 3.單筆_ 變	武檔案 武報告 形量	定速度速率	75.3 kgf
	60.0 50.0		4. 多章_ 旗 5. 多筆_ 統	計曲線		Maximun 2 75.6 kgf
	30.0					6.15 mm 期試速度 mm/min 」14 Zen
	0.0 0.00 0.50	1.00 1.50 2.00) 2.50 3.00 3.50 壓縮[mm] 12/26:311章 92 12	4.00 4.50 5.00 Y= 1	5.50 6.00 6.50 10 X=0.00 11 ^{22 + 11} ,	
	荷重元 (10000 10000 Gasph(F5) Confi	(F9) Filename (E)	「標碼器 #1 3.72 副語業報告 2016061605		16	
	@C002-P fag	平均 1	n x Stal		AF-04	
	and the second					

Apply a test load of 75kg



Distance is 183.9mm after loaded deformation of the specimen at five minutes



Distance is 189.2mm Unload the specimen

	A Testing Set	
E.	1.2 測試資	料設定 Print Help Update Exit
	1. 試件名稱	GT A-RIG-BM050[4N-M]
-	2. 標點距離 3. 試件斷面形狀	1.00 mm 4.不規則斷面 ▼
.	4 a. 断面面積	∯0.0000 mm*2
	40.1 4. 起始荷重	1.000 kgf 起始荷重歸零 All Zero ▼
	5. 最大荷重 20.1 6. 終點荷重	1150.00 kgt ■ 進降·測試條件設定 150.00 % ■ 進降·測試條件設定
	00 7. 最大伸長	 第500.00 mm 測試前歸零 All Zero ▲ 低軟選擇 a. 參考點 P1 b. 參考點 P2 c. 偏移比例
	0. JVHAP#I//SH	15、金んとち 4 0.30 0.45 0.20 %
	Graph(None @C002	K (個長台級) 到 3 00:22:10 HH MM SS 3 1 資料條存比例
	<	

-	▲ C002-F 960323	k		
. Ar	N	27 日本 測試存描	·** 目 版	精機
2	神服 [kgt] 1euu 1400	1.讀取_ 測試檔案 2.單筆_ 測試報告 3.單筆_ 變形量 4.多筆_ 測試曲線	定線度速率 147. 0.00	8 kgf
	1000 80.0	5.多筆_統計曲線	Maximun 150.5	kof
	40.0 20.0 0.0	200 0.00 10.00 12.00	14.00 1600 14.00 1600 14.00 1600	Inv/min
	0.00 200 4.00 荷重元 位移使用温禄孝/1 释述 27醇医務/1 7 27醇医務/1 7 7			
	Rom @C002-Fig THIS			
	<			
	Welcome to Chen Yes	▲ C002-F 960323		

Apply a test load of 150kg



Distance is 174.5mm after loaded deformation of the specimen at five minutes



Distance is 188.7mm Unload the specimen

Apply a test load of 8000kg , the tube broken once at 221.3kg.







The tube fracture at weld, others No obvious deformation

Testing Tables

Load Step	Load(N)	Loaded	Time	Pass/Fail	Unloaded
		Deformation(mm)	Held(s)		Deformation
1	750	7.0	300	Pass	No obvious
					deformation
2	1500	16.4	300	Pass	No obvious
					deformation
Test until	80000	33.2	300	Fail	Tube fracture
failure					deformation

2016.06.22

TEST REPORT FOR 1.0m(3mm) Boom Arm



Below picture for show the statement of the conditions of testing

Before apply a test load, distance between plate and the end of tube is 210.6mm

the test results for specimen as described above in the testing procedure pictures

	N91W
A. Transa Si Total Total	



2 / 8

Apply a test load of 37.5kg



Distance is 198.7mm after loaded deformation of the specimen at five minutes







Apply a test load of 75kg



Distance is 184.3mm after loaded deformation of the specimen at five minutes



Distance is 209.7mm Unload the specimen



		料設定	PI2 Print	P9 R2 Help Update	Ex:
		GT A RIG BM100(3	MM)	Open	
		1.00 m	ım	_	
	3. 試件斷面形狀	4.不規則斷面 ,	-		
	a. 斷面面積	0.0000 m	m^2		27
-0.4-	4. 起始荷重	1.000 kg	1 起始荷重歸零	All Zero 💌	
-0.5	5. 最大荷重	#8000.00 kg	t 置 進階·報告	顯示設定	
-1.0	6. 終點荷重	\$50.00 %	道 港·測試術	条件設定	
	7. 最大伸長	500.00 m	m 測試前歸零	All Zero	
701	8. 求取降伏點	係數選擇 a. 參	考點 P1 b. 参考點 P2	c. 偏移比例	
GranhIE	YES	楊氏係數 🚽	0.30 0.45	0.20 %	
None		K值[點數]	5		
erc.002-	最大測試時間	00:22:10 HH:M	M.SS 1 首料	儲存比例	
				Contraction of the	



Apply a test load of 8000kg , the tube broken once at 151.6kg.





The tube fracture at weld, others No obvious deformation

Testing Tables

Load Step	Load(N)	Loaded	Time	Pass/Fail	Unloaded
		Deformation(mm)	Held(s)		Deformation
1	375	11.9	300	Pass	No obvious
					deformation
2	750	26.3	300	Pass	No obvious
					deformation
Test until	80000	41.67	300	Fail	Tube fracture
failure					deformation

2016.06.22

TEST REPORT FOR 0. 5m (3mm) Boom Arm



The below picture shows the conditions of testing

Results (see graphs overleaf):

Load (kg)	Load (kN)	Deflection (mm)
50	0.5	5.05
75	0.75	7.60

Apply a test load of 50kg

鑫源富金屬制品(深圳)有限公司 ALUFORCE INDUSTRIAL CO.,LTD

廣東省深圳市寶安區沙井鎮芙蓉工業區 TEL:86-755-27255905 FAX:86-755-27255907

材料測試 試驗報告

500

1.Customer : 2.Operator : 3.Lot No. : 2015052808 4.Date : 2015年5月28日 5.Time : 上午 11:24:58 6.Temperature: 25C 7.Speed :20.00mm/min 8.Test Style : Compression Test 9.Standard : 10.Specimen : BOOM ARM-500 11.Spec.Length : 500.000mm 12.Spec.Style : Random 13.Spec.Area : 0.0000mm^2 14.Total Energy: 137kgf • mm 15.Young's Modu. : NaNkgf/mm^2 16.Notice : 17.Filename: E:\潮試報告\2015052808

	Load(kgf)	Elon.(mm)	Stress(kgf/mm^2)	Strain(%)
Peak	50.4	5.05	Inf	1.01
Break	50.4	5.05	Inf	1.01
Yield	0.0	0.00	NaN	0.00



Apply a test load of 75kg

鑫源富金屬制品(深圳)有限公司 ALUFORCE INDUSTRIAL CO.,LTD

廣東省深圳市寶安區沙井鎭美蓉工業區 TEL:86-755-27255905 FAX:86-755-27255907

材料測試 試驗報告

	500
1.Customer :	10.Specimen : BOOM ARM-500*1.5
2.Operator :	11.Spec.Length : 500.000mm
3.Lot No. : 2015052809	12.Spec.Style : Random
4.Date : 2015年5月28日	13.Spec.Area : 0.0000mm^2
5.Time : 上午 11:27:35	14.Total Energy: 309kgf • mm
6.Temperature: 25C	15.Young's Modu. : NaNkgf/mm^2
7.Speed :20.00mm/min	16.Notice :
8. Test Style : Compression Test	17.Filename: E:\涠試報告\2015052809
9.Standard :	

	Load(kgf)	Elon.(mm)	Stress(kgf/mm^2)	Strain(%)
Peak	75.2	7.57	Inf	1.51
Break	75.2	7.60	Inf	1.52
Yield	0.0	0.00	NaN	0.00

