



DESIGN PROJECT GROUP Pty Ltd

CONSULTING ENGINEERS A.C.N. 006777920
215 Albert Street, Brunswick 3056
Telephone: (03) 9388 0801
Fax: (03) 9388 2121
Email: david@designprojectgroup.com.au

PROC: E1(A1)
JUNE 1994

COMPUTATIONS

PROJECT NO: 14110
DATE: Jan '14

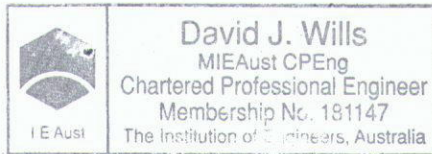
PROJECT TITLE

38 meter diameter tent
for
Janlin Circuses Pty Ltd.

REFERENCES

AS1170
AS4100

ENGINEER



David J. Wills

Signature:

Date: Jan '14

Note :- Tent to be evacuated under the following
a) For Terrain Category 3 and 4 when wind speed reaches 28 m/sec
b) For Terrain Category 1 and 2 when wind speed reaches 25 m/sec

PROC E1

Janlin Circuses Pty Ltd

ABN 29 069 720 225

Trading as Stardust Circus
Lennon Bros Circus

12 Byloss St Chester Hill 2162
0418 238881
Fax 02 96441330

Email: lindsaycircus@hotmail.com

21/1/2014

Design Project Group
Att David Wills

Dear David

Can you please do "Computations" and "Regulation 1507: Certificate of Compliance-Design" for a new tent I have had made in Italy by tent manufacturer "A Tre Alban" and steel structure from "Anceschi Carlo" also in Italy

The material in the tent is Ferrari Preconstraint

Pegs are 40m x 1200 and are driven into ground 1000 Leaving 200 for fastening of ratchets and straps which have a 2500kg rating

I have included documents for the tent and Centre Poles and Side poles etc


I will be using a cupola built in Australia, the same as we have in our current big tents

Please advise of any further info required

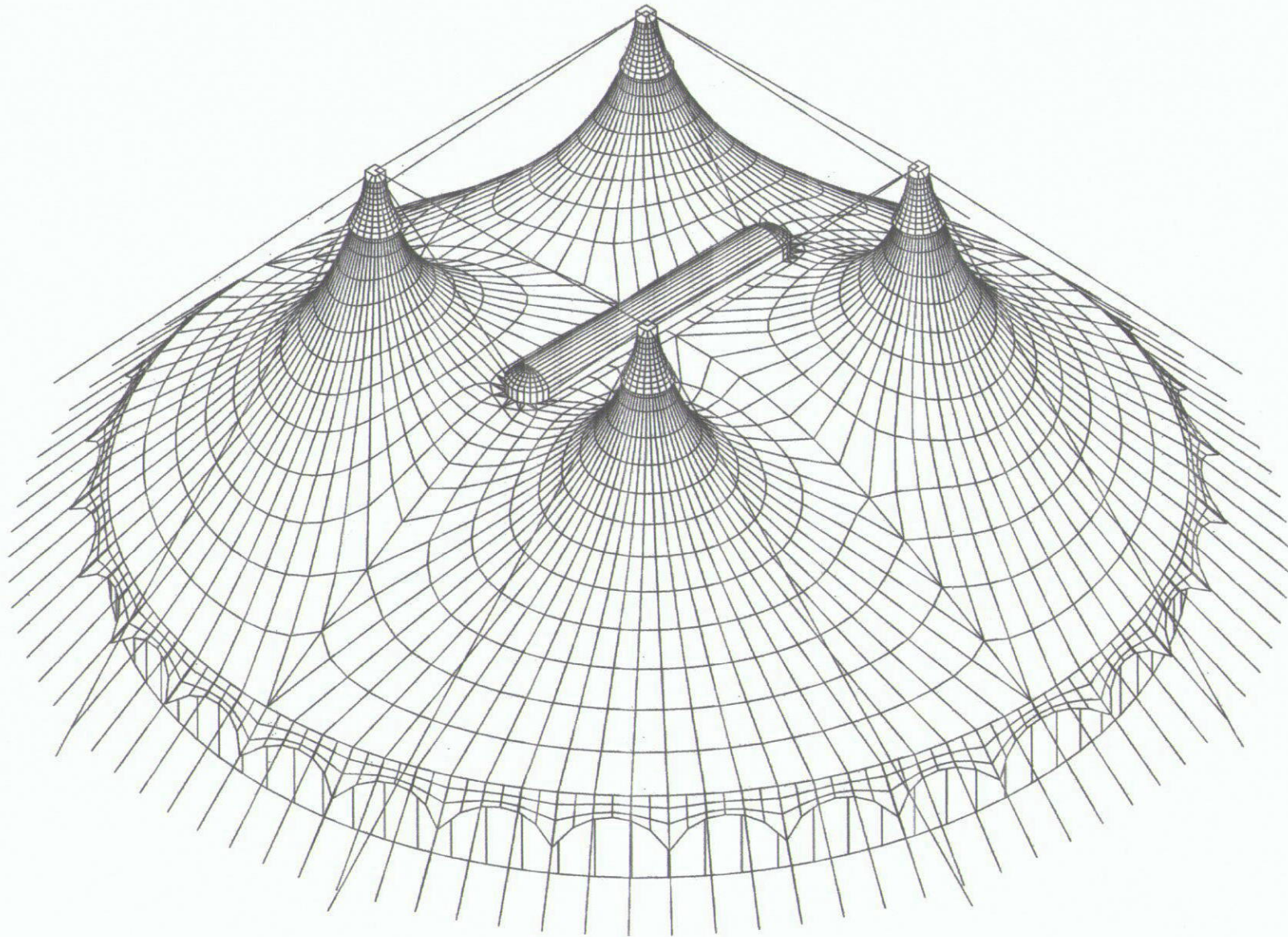
Regards Lindsay Lennon

Centre poles cables and Bale ring specs in attachments also the side poles are 3500 x 60 OD X 3 Wall thickness closed at the base and a pin at the top




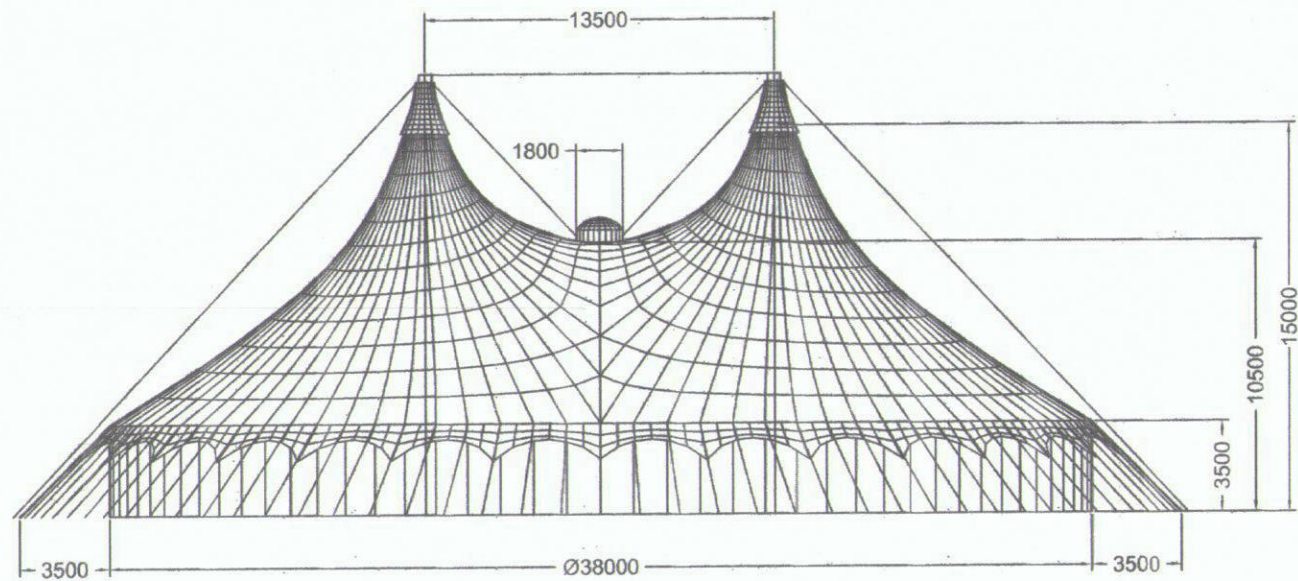
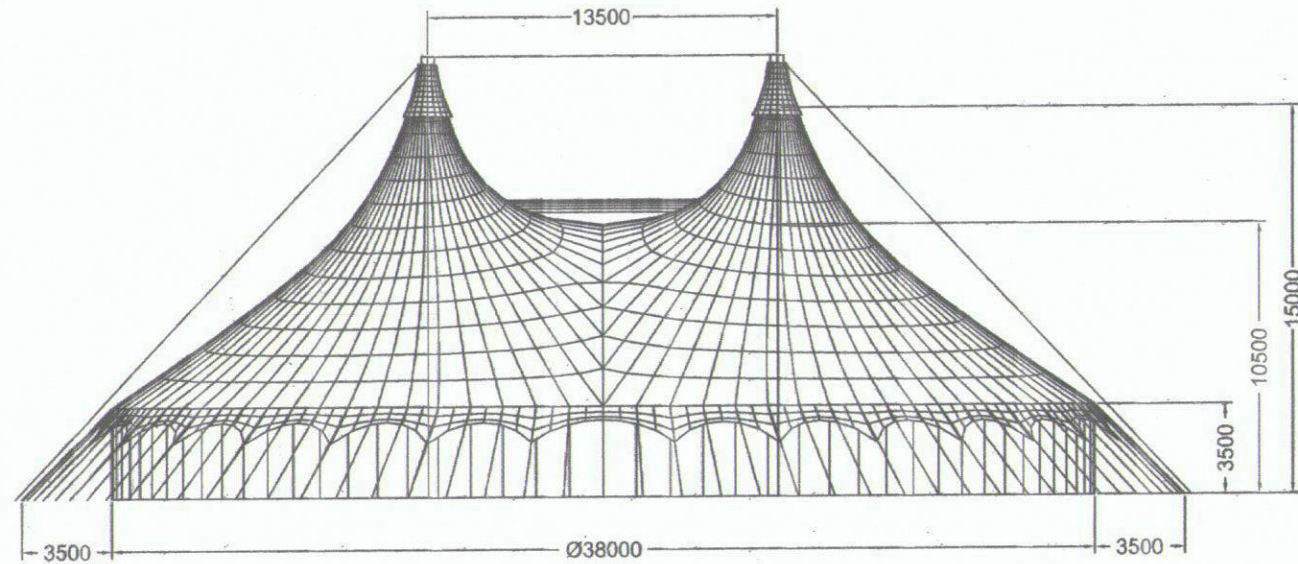
 ALBAN F.LLI s.r.l. MUSSOLENTE - VI - Tel. +390424-577384 WWW.ATREALBAN.COM ITALY	COMMITTENTE: _____	
	DESCRIZIONE/DENOMINAZIONE: circo d.38 - tipo castello	
	DATA: 02/10/13	PROGETTO: cr6513 A
	SCALA:	TAVOLA NR.: DECO3
<small>IL PRESENTE DISEGNO E' PROPRIETA' AZIENDALE. LA SOCIETA' "ATREALBAN" E' I PROPRI DIRITTI A TERMINE DI LEGGE.</small>		

2




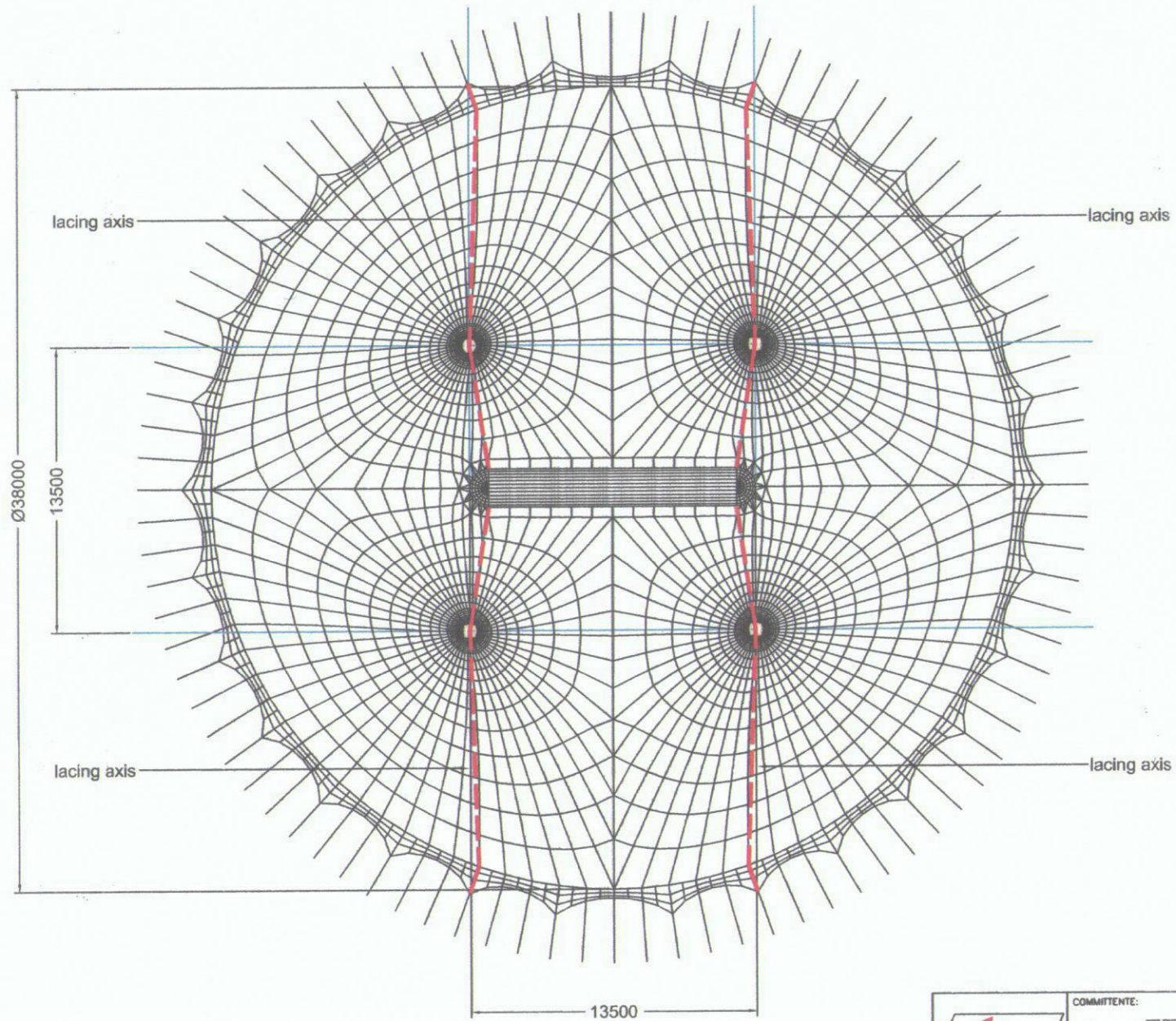
3

 ALBAN F.LLI s.r.l. MUSSOLENTE - VI - Tel. +390424-577384 WWW.ATREALBAN.COM ITALY	COMMITTENTE:	
	DESCRIZIONE/DENOMINAZIONE: circo d.38 - tipo castello	
	DATA: 25/09/13	PROGETTO: cr6513 A
	SCALA:	TAVOLA NR.: v3 14/10
<small>IL PROGETTO CONSEGNO E' PROPRIO E' AZIENDALE. LA SOCIETA' TUTELERA I PROPRI DIRITTI A TERMINE DI LEGGE</small>		



(A)

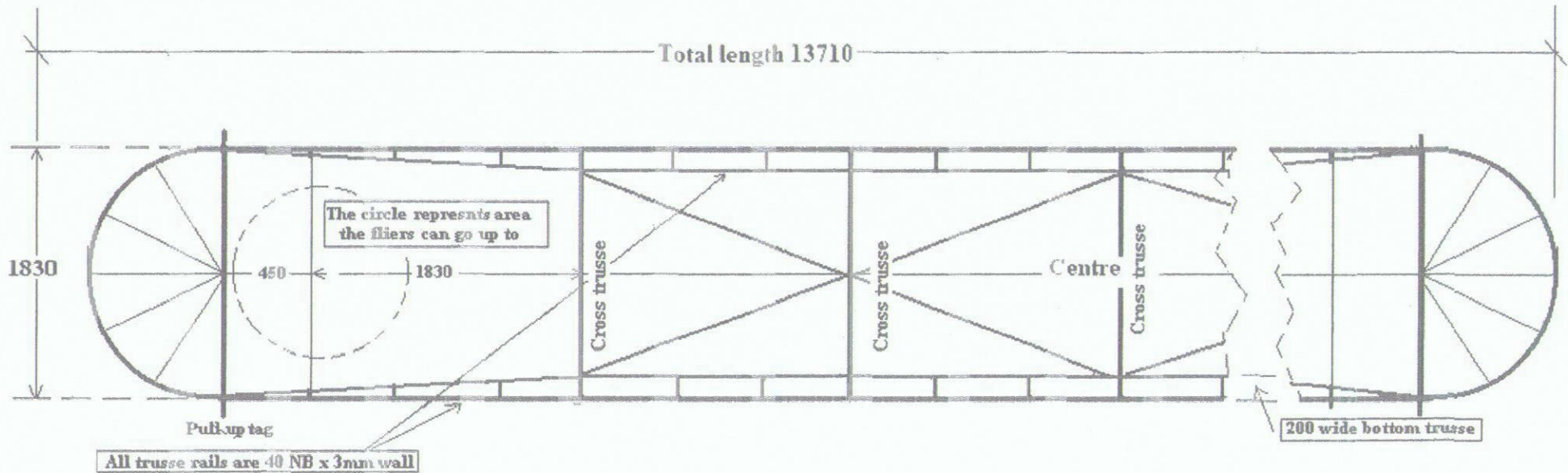
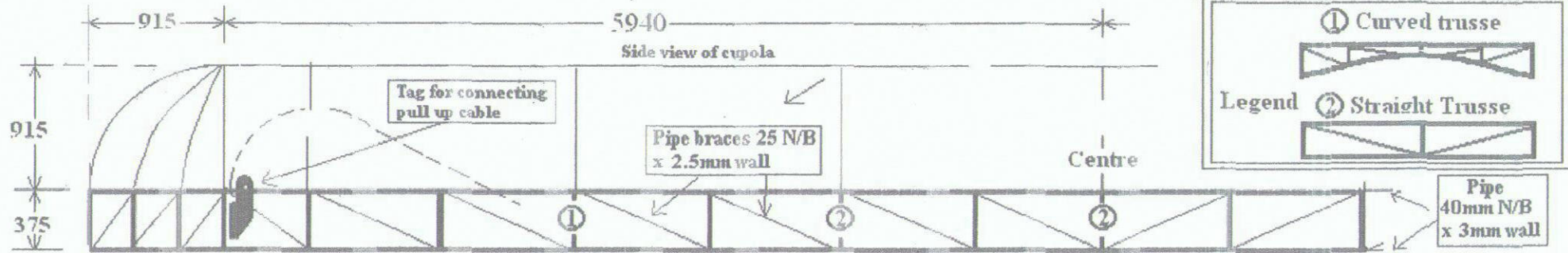
 ALBAN F.LLI s.r.l. MUSSOLENTE - VI - Tel. +390424-577384 WWW.ATREALBAN.COM ITALY	COMMITENTE:		
	DESCRIZIONE/DENOMINAZIONE:	circo d.38 - tipo castello	
	DATA:	25/09/13	PROGETTO:
	SCALA:		cr6513 A
<small>IL PRESIDENTE CONSIGLIO E' PROPRIOETA' AZIENDALE. LA SOCIETA' TUTELA I PROPRI DIRTTI A TERMI DI LEGGE.</small>		TAVOLA NR.:	v2 14110



9

 ALBAN F.LLI s.r.l. MUSSOLENTE - VI - Tel. +390424-577384 WWW.ATREALBAN.COM ITALY	COMMITTENTE: _____	
	DESCRIZIONE/DENOMINAZIONE: circo d.38 - tipo castello	
	DATA: 27/08/13	PROGETTO: cr6513 A
	SCALA:	TAVOLA NR.: SCH_00 14/10
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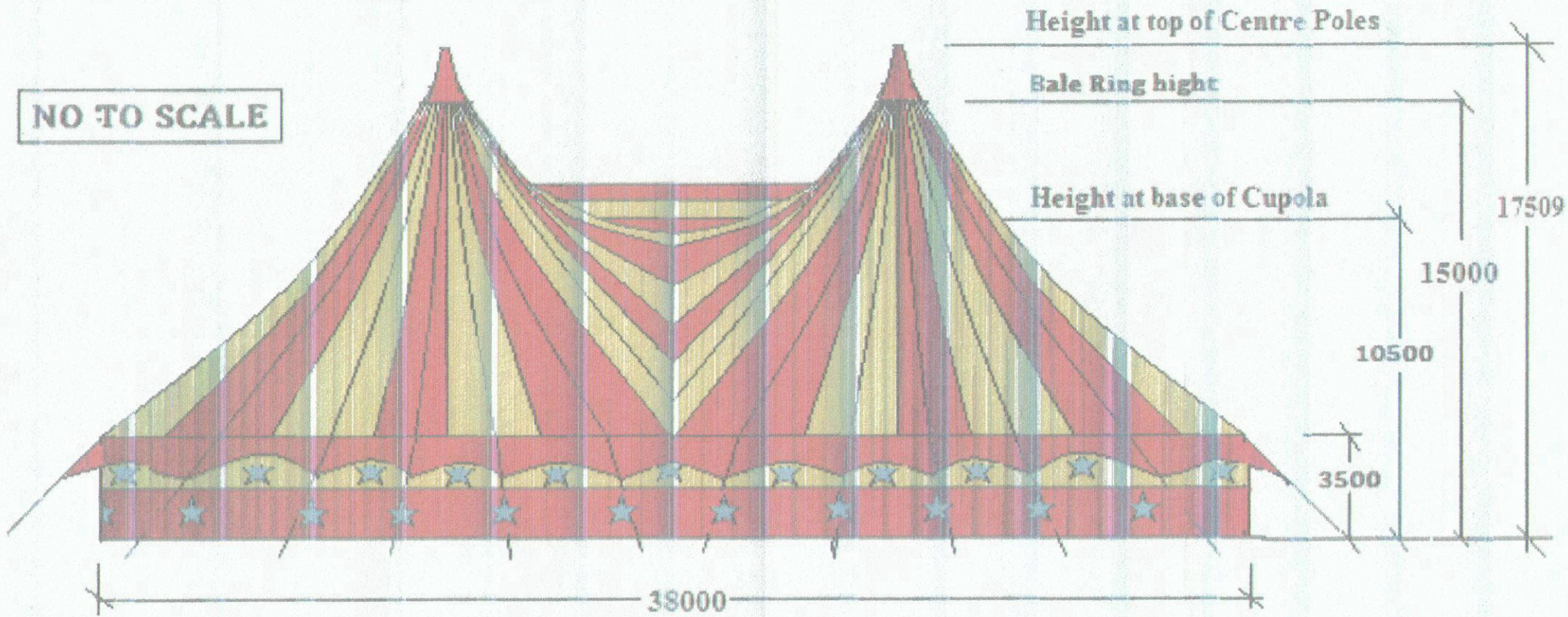
Cupola frame for 38m diameter tent for Janlin Circuses Pty Ltd



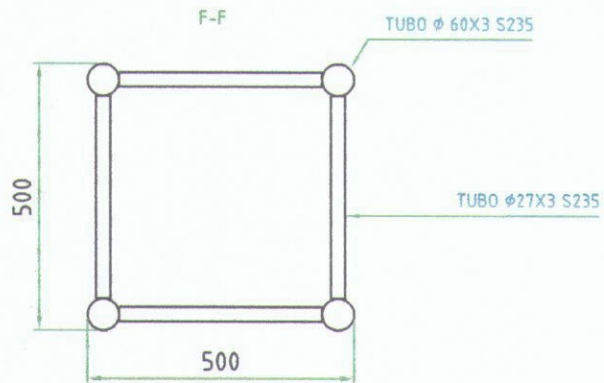
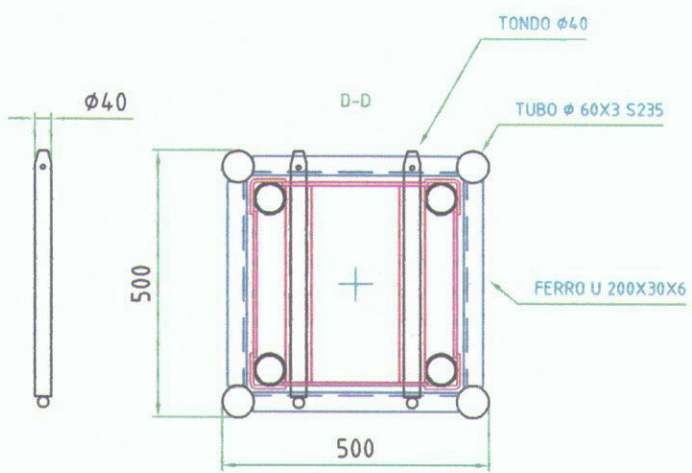
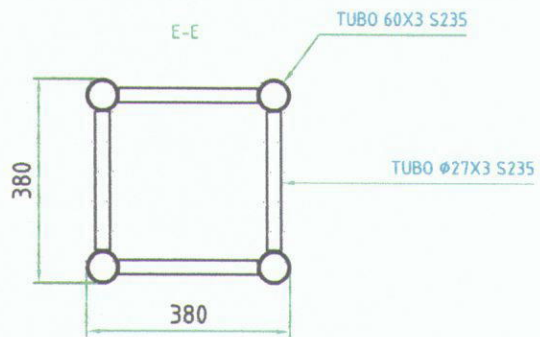
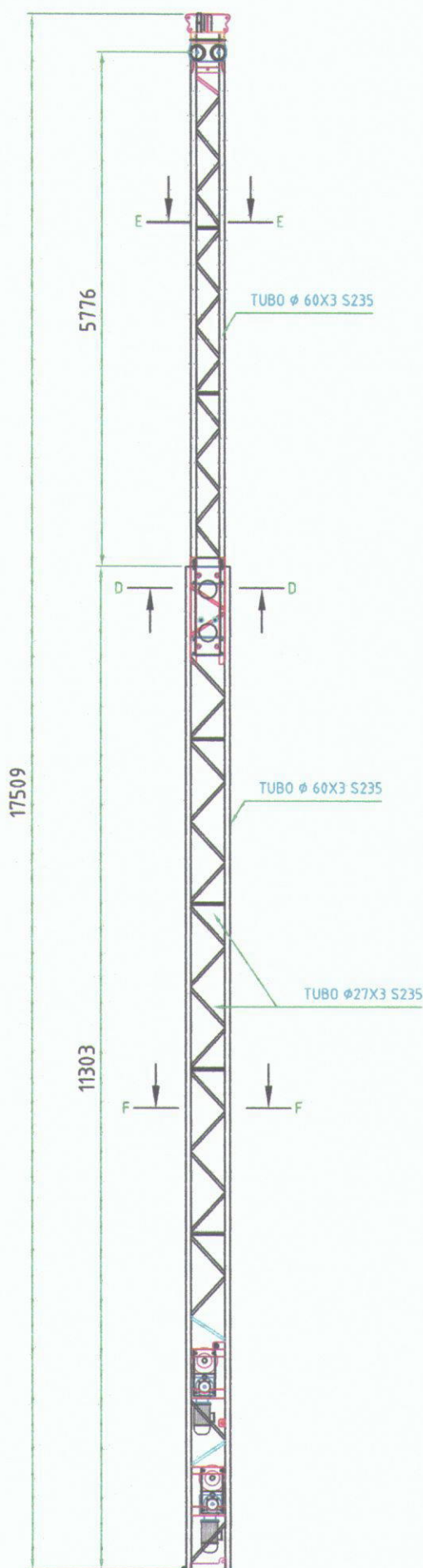
NOT TO SCALE

38m Diam Tent for Janlin Circuses Pty Ltd

NO TO SCALE



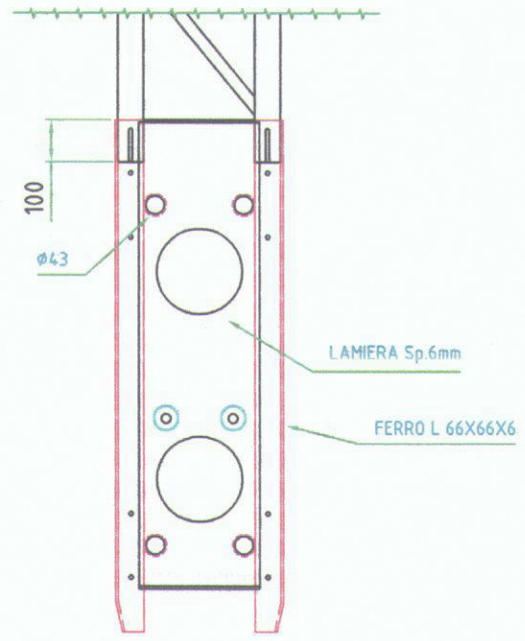
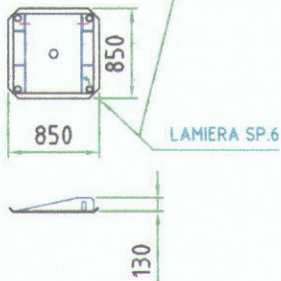
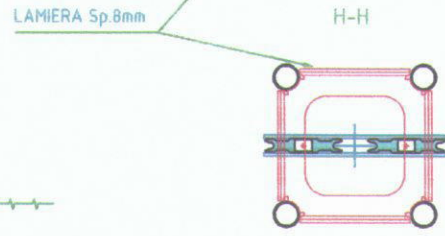
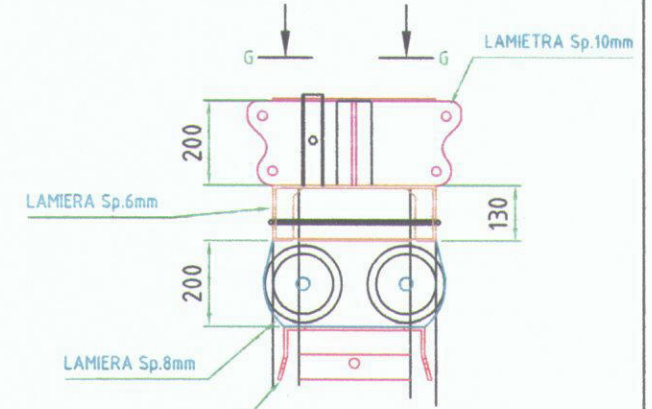
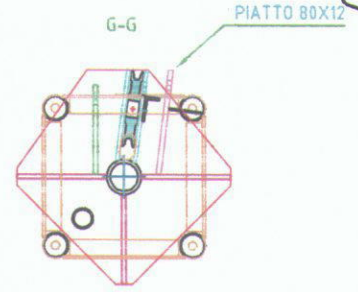
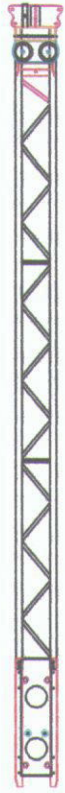
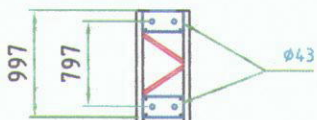
Side walls have 1500 permantely attached to the edge of tent along side pole line and the base 2000 hooks onto the bottom of 1500 top section of wall



ANCESCHI CARLO & C. Via MARCONI, 17 RIO SALICETO (RE) ITALY
 OFFICINA COSTRUZIONI MECCANICHE Tel.0522/738071 Fax.0522/649920
 www.anceschicarlo.it

DENOMINAZIONE: Telescopio KingPole H=17.5m Tenet Ø38M	N° PEZZI 4	CODICE DISEGNO ATTLXX0001	POS. 1
CLIENTE: Lindsay Lennon	MATERIALE se non diversamente specificato: S 235	SCALA DIS. 1:50	Umberto
N° ORDINE: 05-L-13		DATA 12/12/2013	

SALDATURE:
Tutte le saldature, se non diversamente indicate, sono di tipo continuo.
Per l'unione dei tubi, se non diversamente specificato, a = allo spessore minimo dei due elementi uniti.
Per l'unione di piatti, se non diversamente specificato, vedere dettagli A e B.

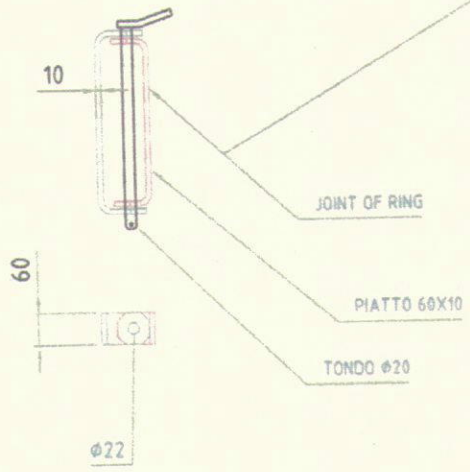
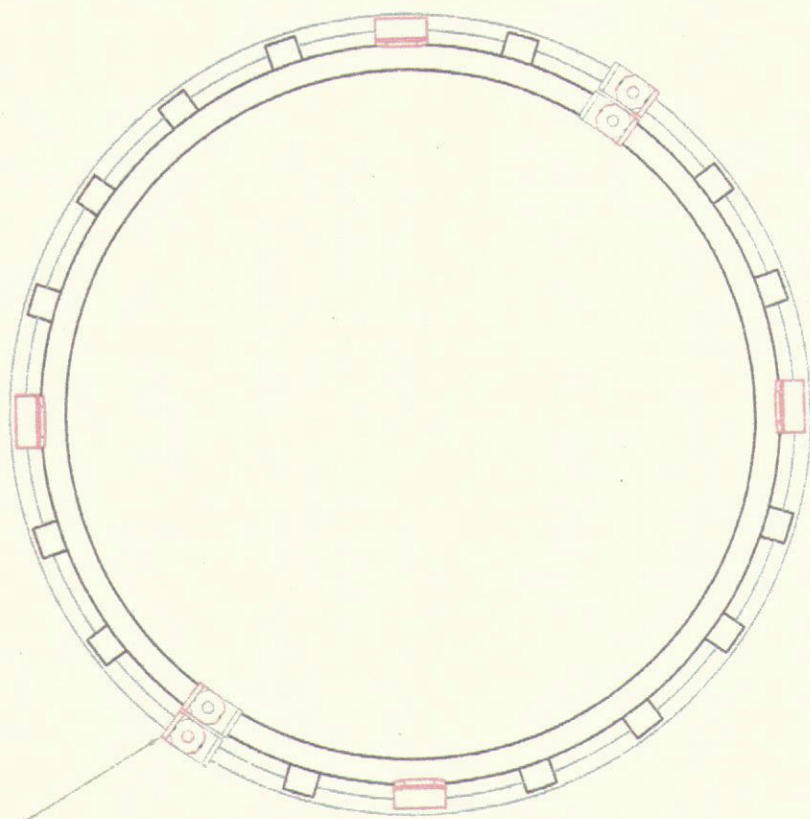
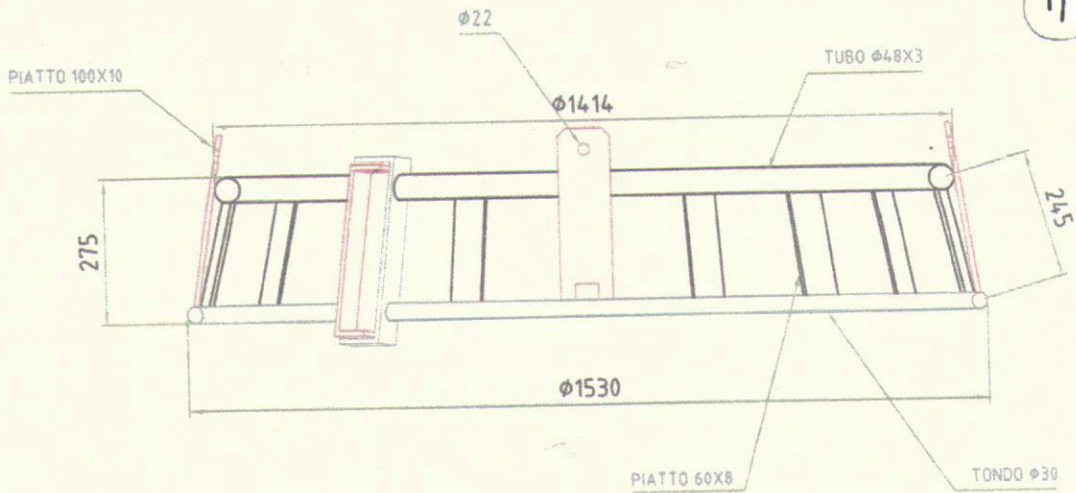


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DENOMINAZIONE: Telescopio KingPole H=17.5m Tenet Ø38M	N° PEZZI 4	CODICE DISEGNO ATTLXX0001	POS. 2
CLIENTE: Lindsay Lennon	MATERIALE se non diversamente specificato: S 235	SCALA DIS. DATA	1:50 Umberto 12/12/2013
N° ORDINE: 05-L-13	SALDATURE: Tutte le saldature, se non diversamente Indicate, sono di tipo continuo. Per l'unione dei tubi, se non diversamente specificato, a = allo spessore minimo dei due elementi uniti. Per l'unione di piatti, se non diversamente specificato, vedere dettagli A e B.		

dettaglio A
S1 ≥ S2
H = 0,7xS2
a = 0,5xS2

dettaglio B
S1 ≥ S2
H = S2
a = 0,7xS2

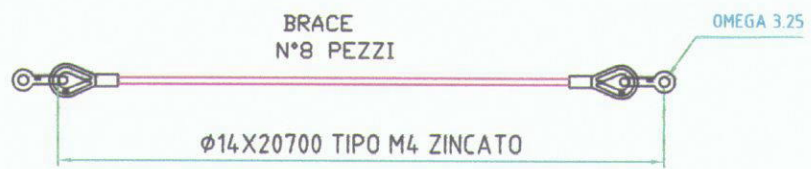
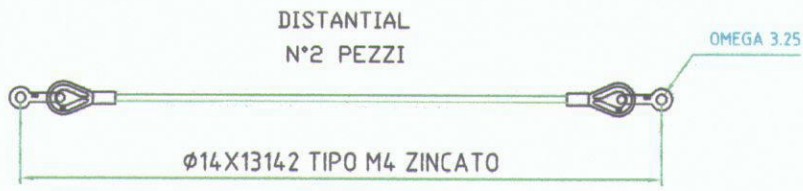
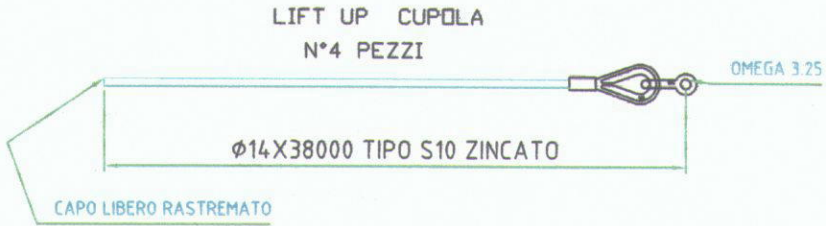
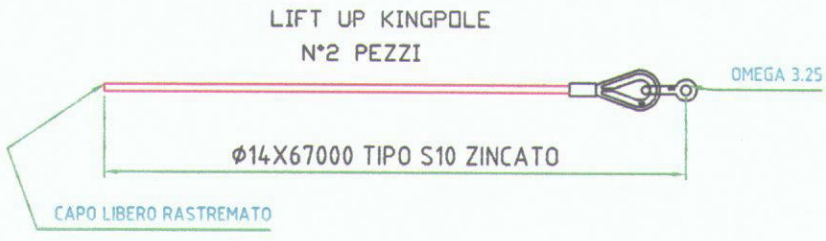


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OFFICINA COSTRUZIONI MECCANICHE Tel.0522/738071 Fax.0522/649920
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DENOMINAZIONE:	N° PEZZI	CODICE DISEGNO	POS.
RING Ø1500 Tent Ø38M	4	ANTRXX0001	3
CLIENTE: Lindsay Lennon	MATERIALE se non diversamente specificato: S 235	SCALA DIS. DATA	1:10 Umberto 12/12/2013
N° ORDINE: 05L13	<p>SALDATURE: Tutte le saldature, se non diversamente indicate, sono di tipo continuo. Per l'unione dei tubi, se non diversamente specificato, a = allo spessore minimo dei due elementi uniti. Per l'unione di piatti, se non diversamente specificato, vedere dettagli A e B.</p>		

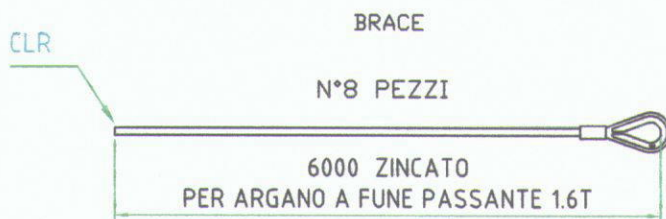
dettaglio A
S1 ≥ S2
H = 0,7xS2
a = 0,5xS2

dettaglio B
S1 ≥ S2
H = S2
a = 0,7xS2

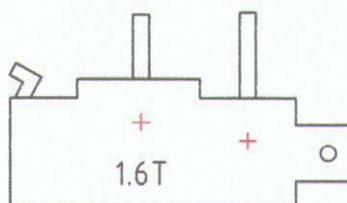


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www.anceschicarlo.it

DENOMINAZIONE: Cables 1 Tent Ø38M	N° PEZZI	CODICE DISEGNO	POS. 4
CLIENTE: Lindsay Lennon	MATERIALE se non diversamente specificato: S 235	SCALA DIS. DATA	1:10 Umberto 12/12/2013
N° ORDINE: 05L13	<p>SALDATURE: Tutte le saldature, se non diversamente indicate, sono di tipo continuo. Per l'unione dei tubi, se non diversamente specificato, a = allo spessore minimo dei due elementi uniti. Per l'unione di piatti, se non diversamente specificato, vedere dettagli A e B.</p> <p>dettaglio A S1 ≥ S2 H = 0,7xS2 a = 0,5xS2</p> <p>dettaglio B S1 ≥ S2 H = S2 a = 0,7xS2</p>		



N°8 ARGANI A FUNE PASSANTE DA 1.6t



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OFFICINA COSTRUZIONI MECCANICHE		Tel.0522/738071 Fax.0522/649920		
www.anceschicarlo.it				
DENOMINAZIONE: Cables 3 Tent Ø38M		N° PEZZI	CODICE DISEGNO	POS. 6
CLIENTE: Lindsay Lennon	MATERIALE se non diversamente specificato: S 235	SCALA	1:10	
N° ORDINE: 05L13		DIS.	Umberto	
		DATA	12/12/2013	
SALDATURE: Tutte le saldature, se non diversamente indicate, sono di tipo continuo. Per l'unione dei tubi, se non diversamente specificato, a = allo spessore minimo dei due elementi uniti. Per l'unione di piatti, se non diversamente specificato, vedere dettagli A e B.		 		



MARQUEES

WIND LOADING

From AS 1170

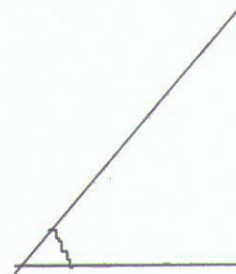
Vp = 41m/sec from West (1in 100 year)

TERRAIN CATEGORIES 3 AND 4

Vz = VMzcat.Ms

= 41 x 0.83

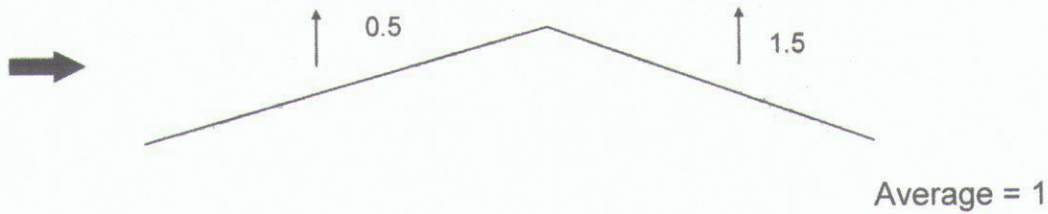
= 34.0 m/sec



qz = 0.6 x 34^2 x 10^-3

= 0.694 kPa

Worst case when sides are up and blocked underneath



Therefore wind load on roof = 1 x 0.694 kPa

= 0.694 kPa

TERRAIN CATEGORY 2 & 1

Wind Load = (0.91 / 0.83)^2 x 0.694 = 0.8342 kPa

Checked

Date



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Computations

Job No. 14110 Sheet No. 15
Eng. OMW Date. Jan '14

3.2.4 Terrain Category.

Terrain, over which the approach wind flows towards a structure, shall be assessed on the basis of the following category descriptions.

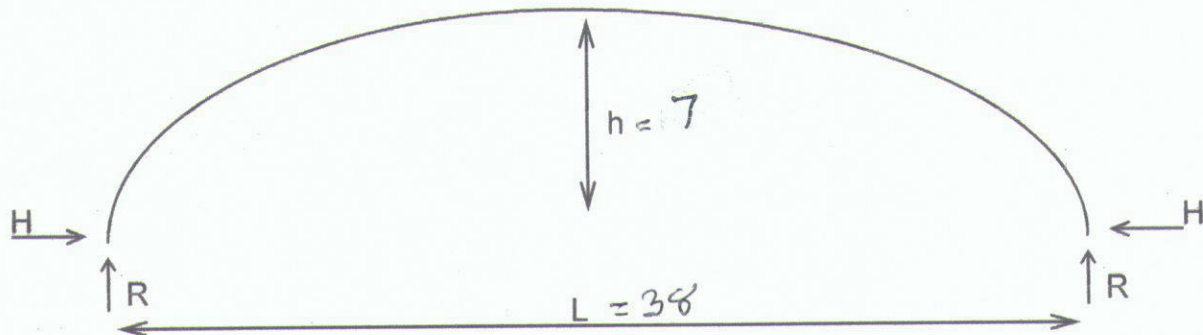
- (a) Category 1 - exposed open terrain with few or no obstructions and water surfaces at servicing wind speeds (V_s) only.
- (b) Category 2 - open terrain, grassland with few well scattered obstructions having heights generally from 1.5 m to 10.0 m and water surfaces at wind speeds (V_u) and (V_p).
- (c) Category 3 - terrain with numerous closely spaced obstructions having the size of domestic houses (3.0 m to 5.0 m high).
- (d) Category 4 - terrain with numerous large, high (10.0 m to 30.0 m) and closely spaced obstructions such as large city centres and well-developed industrial complexes.

Selection of terrain category shall be made with due regard to the permanence of the obstructions which constitute the surface roughness, in particular vegetation in tropical cyclonic regions shall not be relied upon to maintain a wooded terrain roughness.

Checked
Date



PVC COVERING



$$H = 0.694 \times \frac{38^2}{8 \times 7} = 17.895 \text{ kN/m}$$

$$R = 0.694 \times \frac{38}{2} = 6.593 \text{ kN/m}$$

$$T_{\max} = H(1 + 16\theta^2)^{1/2} \\ = 22.25 \text{ kN/m}$$

$$\theta = \frac{7}{38}$$

Capacity of Ferran Preconstraint

$$= \frac{2.5 \times 0.9}{0.090} = 40 \text{ kN/m}$$

OK For all Terrain Categories

Checked

Date

Caractéristiques techniques	Technical data	Technische Daten	Précontraint® 702	
Fil	Yarn	Garn	1100 Dbex PES HT	TERSUISSE
Poids au m²	Weight sqm	Gewicht m²	830 g/m²	EN ISO 2286-2
Largeur	Width	Breite	150 cm	
Résistance rupture (chaîne/trame)	Tensile strength (warp/weft)	Reisskraft (Kette/Schuss)	230/230 daN/5cm	EN ISO 1421
Résistance déchirure (chaîne/trame)	Tear strength (warp/weft)	Weiterrisskraft (Kette/Schuss)	30/28 daN	DIN 53363
Adhérence	Adhesion	Haftung	10 daN/5 cm	EN ISO 2411
Opacité	Blackout	Opak	> 99%	
Finition	Finish (Varnish)	Behandlung (Schlusslack)	Vernis BIFACE	
Réaction au feu	Flame retardancy	Brandverhalten	NF P 92507 M2 - NFPA 701 Test 2 - GSFM 119 DIN 4102-1 B1 - BS 7837 - A3/N2S 1630.3 - SIS 650082, ITAC - UNE 29.727 - M2	
Températures maximum d'utilisation	Temperature extremes (while handling)	Maximale Anwendungstemperaturen	-30°C / +70°C	
Système d'assurance qualité	Quality Insurance	Qualitätssicherung	ISO 9001	
Les caractéristiques techniques indiquées sont des valeurs moyennes	Technical data are average values	Die angegebenen technischen Daten sind Mittelwerte		

Technique d'enduction Précontraint® FERRARI	Précontraint® FERRARI coating technology	Beschichtungstechnik Précontraint® FERRARI
Stabilité dimensionnelle exceptionnelle	Exceptional dimensional stability	Ausserordentliche Flächenstabilität
Durabilité supérieure	Longer durability	Höhere Haltbarkeit
Excellente soudabilité	Excellent welding	Sehr gute Verschweißbarkeit
Opacité spéciale chapiteaux	Special blackout for big tops	Spezielle Opak-Textilien für Zirkuszelte



PRECONTRAIT® 702

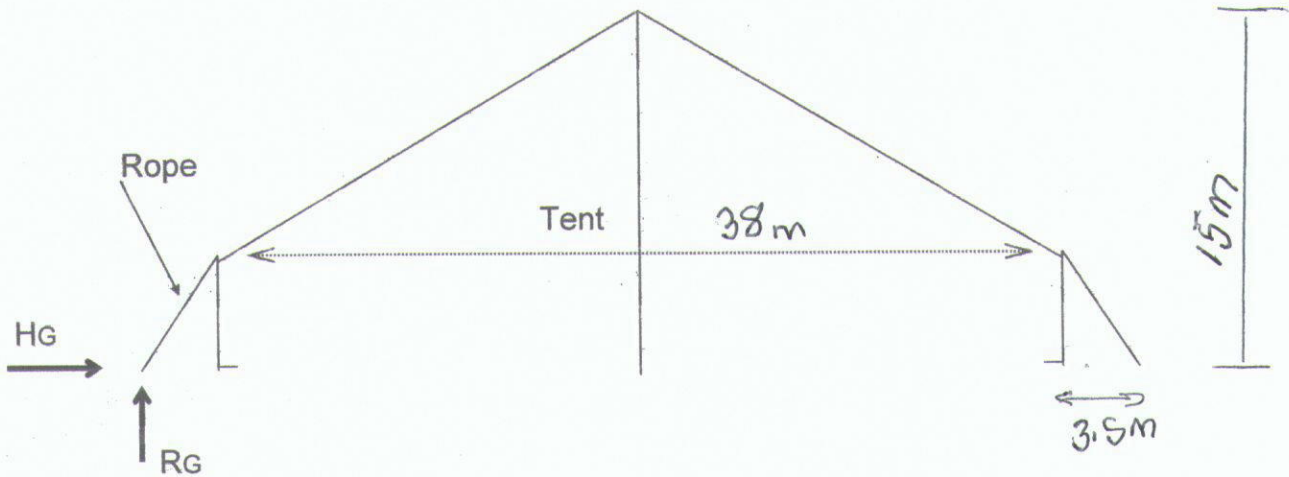
FERRARI

FERRARI SA
 BP 54
 F 38352 LA TOUR DU PIN cedex
 FRANCE
 Tél. + 33 (0)4 74 97 41 93
 Fax + 33 (0)4 74 97 67 20
 www.ferrari-textiles.com

18 04151087M 04/02/11 14/11/11/09/11



ROPE CAPACITY



$$R_g = 6.593 \text{ KN/M}$$

$$H_g \approx 0.694 \times \frac{45^2}{8 \times 15} = 11.71 \text{ KN/M}$$

$$T_{\max} = H(1 + 16\theta^2)^{1/2}$$
$$= 19.52 \text{ KN/M}$$

$$\theta = \frac{15}{45}$$

$$\therefore \text{Load per rope} = 19.52 \times 1.3 = 25.4 \text{ KN}$$

Use 2500 kg capacity straps & ratchets

$$\text{Capacity} = 0.8 \times 25 = 20 \text{ KN}$$

∴ Allowable wind speed $L.S. = 36.38 \text{ m/sec. (TC 3\#4)}$
 $= 33.18 \text{ m/sec. (TC 1\#2)}$

Checked
Date



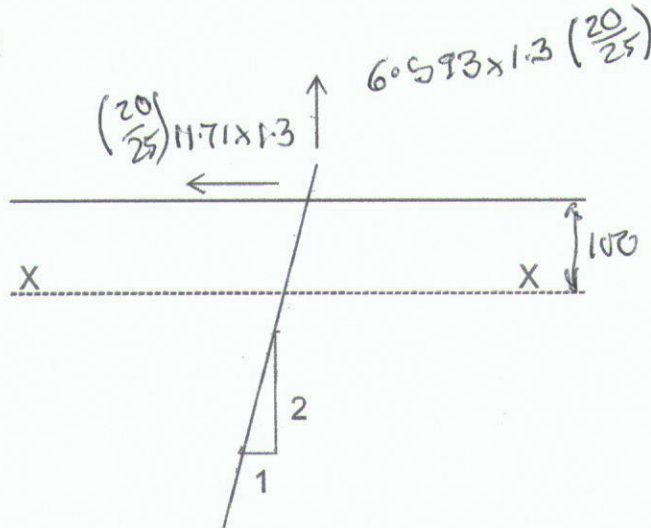
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Computations

Job No. 14110 Sheet No. 19
Eng. DW Date. Jan 14

PEGS



Moment in peg about X - X

$$= (11.71 \times 1.3 \times 0.1 + 0.05 \times 6.593 \times 1.3) \frac{20}{25}$$
$$= (1.951 \text{ kNm}) \frac{20}{25}$$

$$f_b = \frac{1.951 \times 10^6}{0.0982 \times 40^3} \left(\frac{20}{25}\right) = 248 \text{ MPa} < 360 \times 0.9 \text{ MPa}$$

OK

Note:- Depth of peg to be determined on site by experience and testing

Checked

Date



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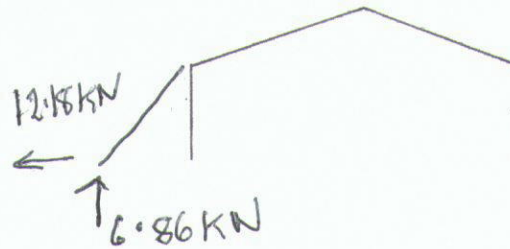
CONSULTING ENGINEERS A.C.N. 006777920
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Computations

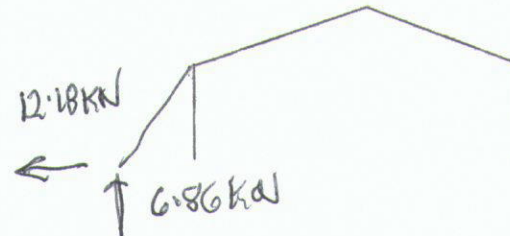
Job No. 1410 Sheet No. 20
Eng. DM Date Jan 14

LOADS (with sides of tent up)

Terrain Category 3 & 4



Terrain Category 2 & 1



Checked
Date



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Computations

Job No. 14110

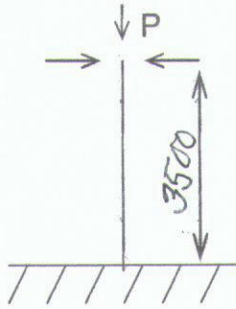
Sheet No. 21

Eng. ONW

Date. Jan 14

SIDE POLES

60ø x 3mm



$$\text{Area} = \pi \times \frac{60^2}{4} - \pi \times \frac{54^2}{4} = 537 \text{ mm}^2$$

$$P = \sqrt{\frac{I}{A}} = \frac{1}{4} \sqrt{60^2 + 54^2} = 20.1$$

$$\frac{L}{P} = \frac{3500}{20.1} = 139$$

$$F_{ac} = 41 \text{ MPa}$$

$$P_{cap} = 22 \text{ kN}$$

$$\begin{aligned} \text{Actual Load} &= 0.01 \times 1.3 \left(3.5 + \frac{3.8}{2} \right) 1.414 \\ &= 0.41 \text{ kN OK.} \end{aligned}$$

Checked

Date



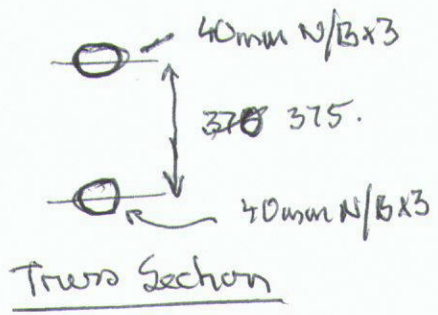
CUPOLA DESIGN



w self wt

Truss - Top chords 40mm N/B x 3 wall see page 7
 Braces 25 N/B x 2.5mm wall

Self wt of half cupola = 0.2 kN/m
wt of canvas $50 \times \frac{38}{2} = 0.17 \text{ kN/m}$
0.4 kN/m



Truss Properties
 $I = 2 \times 405 \times \left(\frac{375}{2}\right)^2 = 28.5 \times 10^6$
 $Z = 779 \times 10^3 \text{ mm}^3$
 $r_x = 187.6$

Moment = $0.4 \times \frac{11.88^2}{8} = 7.05 \text{ kNm}$

Chord Forces = $\frac{7.05}{0.375} = 18.82 \text{ kN}$

Capacity of chords ? $\frac{L}{r} = \frac{1430}{15.2} = 120$ Forc = 53 MPa

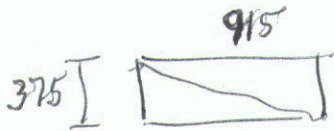
Capacity = $53 \times 405 \times \frac{L}{1000} = 21.5 \text{ kN OK}$

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Web?

$$\text{Mass reaction} = \frac{11.88 \times 0.4}{2} = 2.4 \text{ kN}$$



$$\text{length diagonal} = 989 \text{ mm}$$

$$\text{Mass diag load} = \frac{2.4 \times 989}{375} = 6.33 \text{ kN}$$

$$\text{Tensile capacity} = 33 \text{ kN OK}$$

vertical capacity?

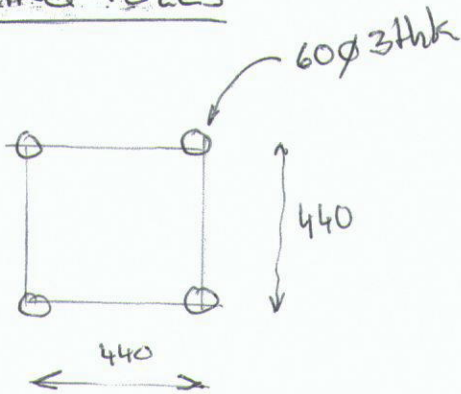
$$\frac{L}{r_y} = \frac{350}{9.75} = 36 \Rightarrow F_{ac} = 130$$

$$\therefore P_{all} = 28 \text{ kN} > 2.4 \text{ kN OK}$$

Deflection

$$\approx \frac{5}{384} \times 0.4 \times \frac{11880}{2 \times 10^5 \times 28.5 \times 10^6}$$

$$= 18.2 \text{ mm} \quad \left(\frac{\text{span}}{642} \right) \text{ OK}$$

KING POLES


60φ x 3thk

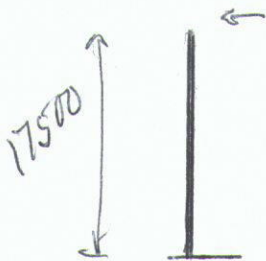
$$Area = 537 \text{ mm}^2$$

I of base section

$$\approx 2 \times 2 \times 537 \times 220^2$$

$$= 104 \times 10^6 \text{ mm}^4$$

$$r_{xc} = \sqrt{\frac{104 \times 10^6}{537 \times 4}} = 220$$



$$\frac{L}{r_x} = 79.5 \quad F_{ac} = 92 \text{ MPa}$$

$$\Rightarrow P_{cap} = 197.6 \text{ kN}$$

OK.

$$Z_{req} = \frac{104 \times 10^6}{220} = 473 \times 10^3 \text{ mm}^3$$

$$\Rightarrow M_{cap} = 65 \text{ kNm}$$

Actual load = 10 kN

$$M = 10 \times \frac{0.44}{2} = 2.2 \text{ kNm}$$

 \therefore Pole OK.



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Computations

Job No. 14110

Sheet No. 25

Eng. *AM*

Date. Jan '14

~~Base Plate~~

850 x 850 sq base plate

100 kPa bearing gwas capacity 72 kN OK.

Checked

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