

Australian Dance Theatre

European Stage Production

Structural check of flat and box trusses to support lighting and other stage equipment



European Stage Production

Structural check of flat and box trusses to support lighting and other stage equipment

Principal Contacts
Mr David Nash

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ADELAIDE
TONKIN CONSULTING
ABN 99 630 962 951
Level 2, 66 Rundle Street
Kent Town SA 5067
T +61 8 8273 3100
F +61 8 8273 3110
adelaide@tonkin.com.au

MOUNT GAMBIER
TONKIN CONSULTING
1 Krummel Street
PO Box 1192
Mount Gambier SA 5290
T +61 8 8723 5002
F +61 8 8723 5004
mtgambier@tonkin.com.au

BERRI
TONKIN CONSULTING
27 Vaughan Terrace
PO Box 2243
Berri SA 5343
T +61 8 8723 5002
F +61 8 8723 5004
berri@tonkin.com.au

DARWIN
TONKIN CONSULTING
Unit 33, 16 Charlton Court
Woolner NT 0820
T +61 8 8981 7155
F +61 8 8981 7455
darwin@tonkin.com.au

JOB Australian Dance Theatre JOB No. 2010.1174
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Checking of trusses to support lights and other stage equipment for a production to be presented by the Australian Dance Theatre (ADT) throughout Europe.

The layout of the trusses is as per the attached drawing for the production "Be Your Self" located in Appendix A.

It basically consists of 5 CHS Heavy-Duty Flat Trusses that are supported by three boom trusses that are Prolyte S52-V Square trusses.

The Flat Trusses span from the front of the stage to the rear and are inclined as shown on the side view of the layout.

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The box trusses span from left to right of the stage

CHECK OF FLAT TRUSSES

truss being used.

CLS Heavy-Duty Flat-Truss by
Concert Lighting Systems Australia

Total length of truss is 11m
made up two 5m long end long
sections of the standard truss.

The trusses are supported by the
box trusses at a maximum 4m etc.

Loading

Attached in Appendix B are the loads
of all the trusses and equipment
that the trusses support. This information
was supplied by the ART.

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On page 2 of the loads the loads given for the Flat truss are as follows

Dead load

Flat truss $\Rightarrow 26.7 \text{ kg}$

under weight of elements on page 1 Appendix B the weights are given as

21.5 kg for 5m long truss

5.2 kg for 1m long truss

\Rightarrow use these figures

for an 11m truss $2 \times 21.5 + 5.2$

$$= 48.2 \text{ kg}$$

\Rightarrow convert to kN

$$\frac{48.2 \times 9.81}{1000}$$

$$= 0.47 \text{ kN}$$

over 11m

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Other dead loads.

⇒ clamps, joggles and cable

total weight = 21 kg

⇒ convert to kN ⇒ 0.21 kN

live loads

consider any equipment such as lights etc as live loads — could be argued as dead loads, particularly

the equipment that does not move. Could be some dynamic effects so consider as live load
5 Motor Stage Cycles

weight per Cycle 10.5 kg

equates to 0.106 kN.

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Consider a 4m section of truss
between the supporting beam trusses.

$$DL \quad \begin{array}{l} \text{truss} \\ 0.49 \\ \hline 11 \end{array} = 0.04 \text{ kN/m} \quad \begin{array}{l} \text{LRNDS} \\ 0.21 \\ \hline 11 \end{array} = 0.02 \text{ kN/m}.$$

$$\text{total DL} = 0.06 \text{ kN/m}.$$

Allow for U configuration will
only allow one cycle on a
4m span - allow for 2
and place at midspan.

$$U + PL = 2 \times 0.10 \\ = 0.20 \text{ kN/m}.$$

for case consider truss simply
supported over the 4m spans

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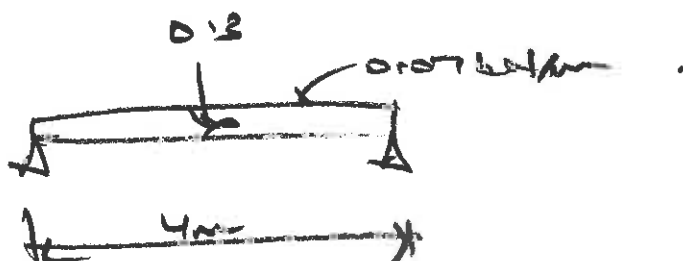
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UDL \rightarrow DL

$$DL_{\text{net}} = 1.2 \times 0.06 = 0.07 \text{ kN/m}$$

PL \rightarrow U

$$L_{\text{net}} = 1.5 \times 0.20 = 0.3 \text{ kN}$$



$$M^* = \frac{0.07 \times 4^2}{8} + \frac{0.3 \times 4}{4}$$

$$= 0.44 \text{ kNm}$$

Look at safe load tables for flat
truss (Appendix C)

for 6m span allowable UDL = 20 kN/m

allowable PL = 67 kN

\Rightarrow rely on lateral support structure

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we have lateral support at 4m c/s.

allowable BM (working loads not ultimate)

$$w \Rightarrow \frac{20 \times 9.81}{1000} \times \frac{6^2}{8} = 0.88 \text{ kNm/m}$$

$$p \Rightarrow \frac{67 \times 9.81}{1000} \times \frac{6}{4} = 0.99 \text{ kNm/m}$$

convert to ultimate BMs

$$\sim 1.5 \times 0.99 = 1.48 \text{ kNm/m for live load only}$$

Our BM $M^* = 0.44 \text{ kNm (Active)}$
→ only 30%

By inspection okay even allowing for 4m lateral restraint instead of 3m.

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Also considered 3m span with no restraint except at ends
allowable BM ult - for flat truss

$$w_L = 1.5 \times \frac{124 \times 9.81}{1000} \times \frac{3^2}{8} = 2.05 \text{ kNm}$$

$$p_L = 1.5 \times \frac{187 \times 9.81}{1000} \times \frac{3}{4} = 2.06 \text{ kNm}$$

Supports flat truss clearly okay even with restraint at 4m.

Check of cantilever

⇒ 1.8m maximum, $l_e = 3.6m$.

⇒ consider cyclic at ends - conservative.

$$M^* = \frac{0.07 \times 9.81^2}{2} + 0.3 \times 1.8 = 0.65 \text{ kNm}$$

⇒ again okay by inspection. OK

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CHECK OF BOX TRUSSES

Truss being used,

Polytec 352-V Square

Safe load tables are in Appendix D

From Appendix B, the heaviest loaded box truss is the Downstage truss,

total length 12m.

Need to determine:

- 1) maximum span between end supports
- 2) maximum cantilever from support.

→ always two supports per truss.

Consider Case 1)

→ Consider maximum case, that is
with supports at each end hence
a span of 12m.

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total load

DL weight of the box truss plus
the weight of the flat trusses.
* extras, (cables, gupys)

Flat trusses - each weighs 48.2 kg
for 11m long
truss

⇒ $\frac{1}{2}$ of the flat truss load carried
by each box truss (5 flat trusses)

load to the downstage box truss
from the 5 flat trusses

$$= 5 \times 48.2 / 2 = 120.5 \text{ kg}$$

weight of box truss is 130 kg

extra dead load on flat truss of
21 kg per truss

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$$\rightarrow \text{extra load} \quad \frac{21 \times 5}{3} = \underline{35} \text{ kg}$$

extra dead load on box truss 20 kg at
(downstage) cable.

Total dead load on downstage truss

$$= 80.3 + 180 + 35 + 20$$

$$= \underline{315.3} \text{ kg}$$

Live load LL

from Appendix B on downstage truss

$$\begin{aligned} \text{Total LL} &= 64 + 40 + 26.4 + 50 \\ &\quad + 20 + \frac{5 \times 5 \times 10.5}{3} \\ &= \underline{208} \text{ kg} \end{aligned}$$

↑
Cyclor on
Post truss

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From Appendix D

single point load for a 12m
spanning truss allowable load
is 1214.1 kg.

⇒ equivalent to line load and
ours is only 288 kg

⇒ add DL ⇒ $288 + 315.3$
 $= 603.3 \text{ kg}$

⇒ our load is not all at the
centre of the span.

For strength box truss easily
okay even if we have to apply a 0.85
reduction as per rates on load tables.
Check deflection -

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Our loading is more akin to
point loads at 4 locations.

from safe load tables for a
7 load case

deflection is approximately
62mm if the loads are
each 503.3 kg.

Our load even including the
weight is only $\frac{603.3}{4} = 151 \text{ kg}$.

$$\text{deflection} \approx \frac{151}{504} \times 62$$

$$= 18.6 \text{ mm}$$

\Rightarrow Span / 645 easily acceptable.

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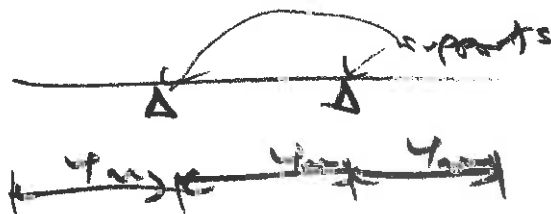
for case 1)

The support points can be at each end of the truss that is 12m apart.

Case 2) - Cantilever cases

must have two supports and should have the bridge length equal to the cantilever.

worst case 4m cantilever



would allow

	Δ	Δ	
2m	5m	4m	
3	6	3	
2	6	4	

etc.

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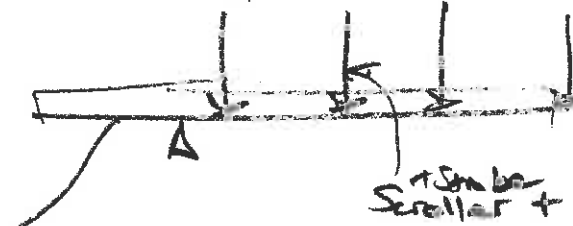
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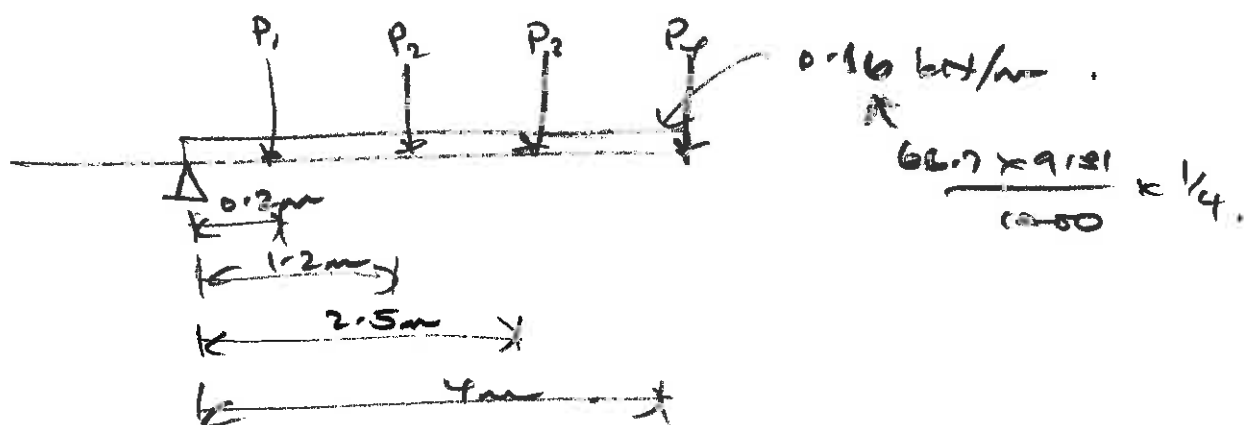
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$$\text{Foot Truss} - (30.3 + 35 + 87.5) / 5 = 41 \text{ kg}$$


$$\text{DL beam truss} = 10 + 31.8 + 35 = 53.8 \text{ kg}$$

$$+ \text{cable } 20/3 = 6.7 \text{ kg}$$



$$P_1 = P_3 = \frac{41 \times 9.81}{1000} = 0.4 \text{ kN}$$

$$P_2 = \frac{53.8 \times 9.81}{1000} = 0.5 \text{ kN}$$

$$P_4 = \frac{32 \times 9.81}{1000} = 0.3 \text{ kN}$$

$$BM = \frac{0.16 \times 4^2}{2} + 0.4 \times 0.2 + 0.5 \times 1.2 + 0.4 \times 2.5 + 0.3 \times 4$$

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= 4.2 kNm working moment

Sorte load table for box truss

⇒ choose

1m span 4-DC 354.4 kg

$$BM = \frac{354.4 \times 9.31}{1000} \times \frac{6^2}{8}$$

$$= 37.7 \text{ kNm}$$

10m span central point load

$$BM = \frac{1789.9 \times 9.31}{1000} \times \frac{10}{4}$$

$$= 36.5 \text{ kNm}$$

⇒ cantilever will be worse but

our moment data is only

4.2 kNm < 36 kNm allowable

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⇒ By inspection last time ok
for strength even allowing for
 $\alpha = 0.85$ reduction.
deflection - tables do not consider
cantilevers

Point load at end of cantilever

$$\Delta = \frac{Pl^3}{3EI}$$

Point load at midspan of simply
supported beam

$$\Delta = \frac{Pl^3}{48EI}$$

cantilever deflection is $\frac{48}{3} = 16$ times
simply supported deflection.

Our total pile in cantilever

$$\text{equal to } 0.16 \times 4 + 2 \times 0.4 + 0.5$$

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$$= 2.24 \text{ kN/m}$$

SS 4m span from end load tables
point load in middle

$$\Rightarrow 3882.3 \text{ kg} \approx 38 \text{ kN}$$

\Rightarrow deflection of 9mm

we only have 2.24 kN/m

$$\text{deflection} \approx \frac{2.24}{38} \times 9$$

$$= 0.5 \text{ m}$$

\Rightarrow cantilever with load at end

$$\text{deflection} \approx 0.5 \times 16 = 8 \text{ mm}$$

span / 500 on acceptable

BOX TRUSSES ARE ADEQUATE FOR
STRENGTH AND DEFLECTION

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Summarising

Flat truss: CLS Heavy-duty
Flat Truss

Box truss: Prolyte S52-V-Square

- 1) Flat trusses are structurally adequate and acceptable for deflection.
- 2) Box trusses are structurally adequate and acceptable for deflection for;
 - A) 12m span between supports
 - B) 4m maximum cantilever from support

Note: There must be a minimum two supports for the box trusses

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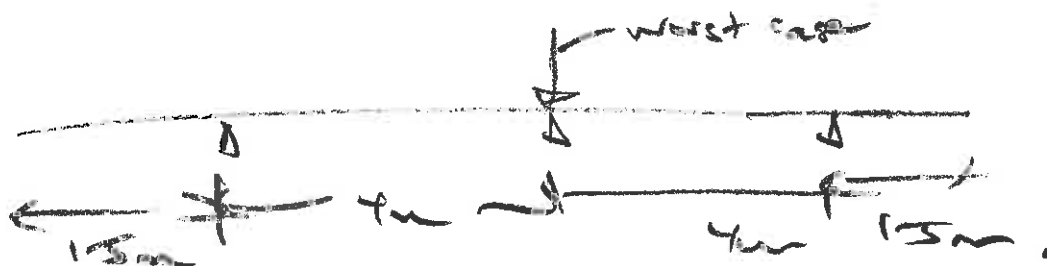
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Yippys not support the flat trusses.

Maximum load on flat truss

$$\begin{matrix} \text{SW} & \text{concrete} & \text{cylinder} \\ 43.2 & + & 21 + 52.5 \\ & & = 122 \text{ kg} \end{matrix}$$

configuration is



worst load

$$122 \times \frac{4}{11} = 44 \text{ kg}$$

Slings Hoisting Equipment

$$\Rightarrow \text{SWL} = 200 \text{ kg}$$

\Rightarrow easily okay.

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Loads on Chains Connected to Beams in Theatre

8m chains in total - 2 per box truss

Different configurations are possible as noted below.

slings		Directs	
1	2	max load with 1	cantilever no more than 4m single point no more than 12m
4m	4m	4m 6m	
3m	5m	4m 6.5m	
2m	6m	4m 7m	
1m	7m	4m 7.5m	
0m	8m	4m 8m	
0m	9m	3m 7.5m	
0m	10m	2m 7m	
0m	11m	1m 6.5m	
0m	12m	0m 6m	

For the above situations the maximum load on either 1 or 2 can be $\frac{3}{12}$ of

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the total load on a box truss
You would expect that in most
theatres the supporting beams will
be near the centre of the stage
hence the arrangement of supports
will be uniform, that is the
centres will be equal, as
below

0	12	0
1	10	1
2	8	2
3	6	3
4	4	4

→ in these cases the load will
be half to each side except

in the case of the downstage
truss where there is one extra
source light to one side. ^{the truss}
the other

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If we allow for 4 source lights instead of three then $\frac{1}{2}$ the load goes to each along.

Downstage Truss

Dead load

Flat truss +
clamps & gypsies $\frac{(48.2 + 6 + 15) \times 5}{3} = 115.3 \text{ kg}$

Box truss +
cable $100 \times 20 = 2000 \text{ kg}$

Live Load - The equipment could be considered dead loads but some can move has been considered as live load - conservative approach for ultimate loads.
- allowed for 4 source lights, one next to each projector.
(3 only to be provided)

Flat truss
stage cyclors $\frac{52.5 \times 5}{3} = 87.5 \text{ kg}$

All equipment
on box truss $64 + 40 + 35.2 + 50 + 20 = 209.2 \text{ kg}$

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Additional line load from the motor & chain
at each support = 125 kg

TOTALS — DOWNSTAGE TRUSS

Dead load $115.3 + 200 = 315.3 \text{ kg}$

Live load $871.5 + 209.2 = 296.7 \text{ kg}$

TOTAL working load = 612 kg

load per chain = $\frac{612}{2} + 125$

= 431 kg

ult load per cable $1.2 \times \frac{315.3}{2} + 1.5 \left(\frac{296.7}{2} + 125 \right) = 599.2 \text{ kg}$

Midstage Truss

Dead load

#1st truss +
clamps & yppys

115.3 kg

2nd truss & cable

200 kg

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Live load

Flat truss
strong cycles

87.5 kg

All equipment
on truss

64 + 40 + 35.2 = 139.2 kg

Additional (motors) + chain

125 kg

TOTALS - MID-STAGE TRUSS

Dead load

315.3 kg

Live load 87.5 + 139.2

226.7 kg

TOTAL WORKING
LOAD

542 kg

Load per chain $\frac{542}{2} + 125 = \underline{\underline{396 \text{ kg}}}$

ultimate load $1.2 \times \frac{315.3}{2} + 1.5 \left(\frac{226.7}{2} + 125 \right)$
= 546.7 kg

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Upstage Truss

Dead load

Flat truss etc 115.3 kg
Bar truss etc 180 + 25 205 kg

Live load

Flat truss cycles 37.5 kg
Equipment on bar truss 64 + 40 104 kg

Additional motor & chain 125 kg

TOTAL - UPSTAGE TRUSS

Dead load 320.3 kg

Live load 191.5 kg

TOTAL WORKING LOAD

511.8 kg

Load per chain $\frac{511.8}{2} + 125 = \underline{\underline{380.9 \text{ kg}}}$

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$$\text{ultimate load} = 1.2 \times \frac{320.3}{2} + 1.5 \left(\frac{191.5}{2} + 125 \right) \\ = 523.3 \text{ kg}$$

Summarising

<u>Box Truss</u>	<u>Chain Stage Light</u>		<u>Chain Stage Left</u>	
	<u>Working</u>	<u>Ultimate</u>	<u>Working</u>	<u>Ultimate</u>
Downstage	431 kg	599.2 kg	431 kg	599.2 kg
Mid-stage	396 kg	546.7 kg	396 kg	546.7 kg
Up stage	380.9 kg	523.3 kg	380.9 kg	523.3 kg

THE ABOVE FIGURES ARE FOR EVEN LOADING THAT IS THE CANTILEVERS ON THE BOX TRUSS EACH SIDE ARE EQUAL

The following table is the worst case condition where $\frac{8}{12}$ is two - no cable and $\frac{4}{12}$ is the other cable - where the

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containers are not the same - bigger
containers to stage right

Bar Areas

Chain Stage Right

Chain Stage Left

Working Ultimate

Working Ultimate

Downstage

533 kg 736.7 kg

325 kg 462 kg

Mid-stage

436.3 kg 666.4 kg

305.7 kg 427 kg

Upstage

466.2 kg 635.3 kg

295.6 kg 411.4 kg

The above figures are swapped for
stage right / stage left if the bigger
containers fit to the stage left side

To be conservative design for
the maximum figures from record
table for each cable, that is
533 kg for both cables that support
the downstage truss, etc.

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Cable Strength

From previous calculations by Menhardt
chain has a rated load of 1000 kg

Assume this is an ultimate load
(Variable SM10 + Appendix E)

Maximum ultimate load is 793.9 kg

From downrating three lane cable
is adequate.



BE YOURSELF

Director
GARRY STEWART
Scenic Design

Costume Design

Lighting Design
DAMIEN COOPER
Master Electrician

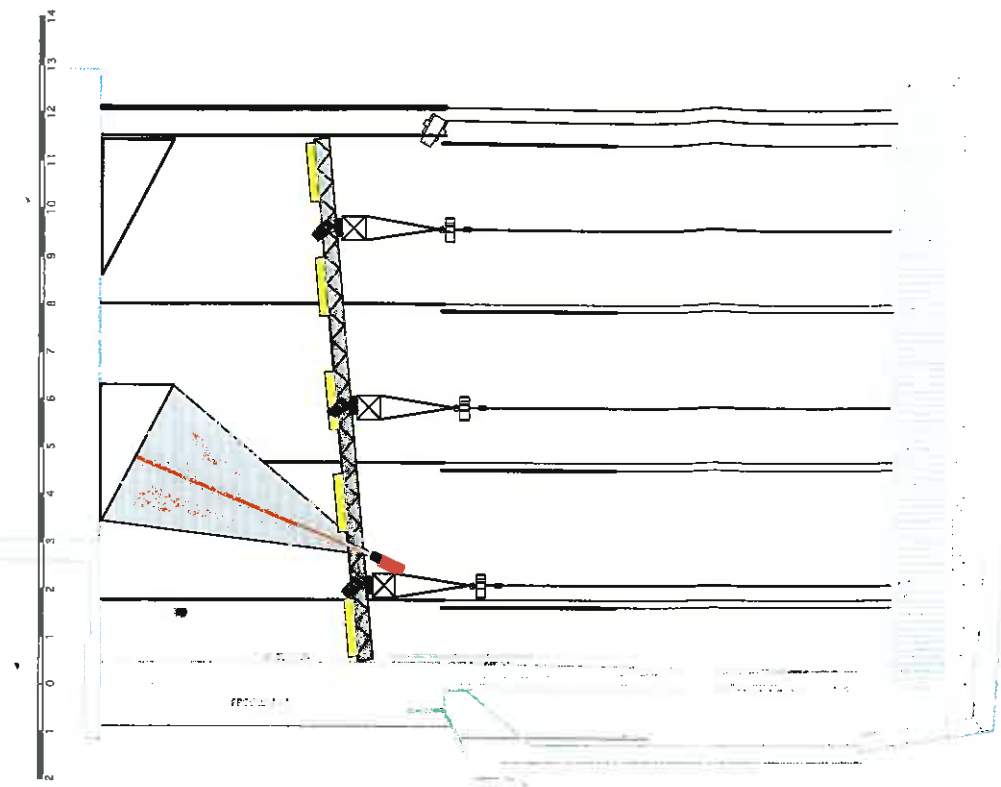
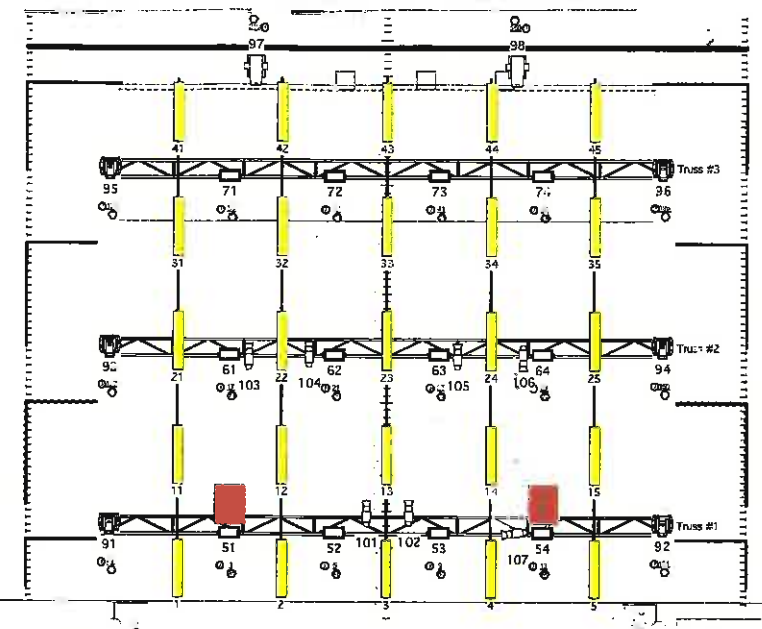
Her Majestys
AFCT

DRAFT #2
Lighting Plan
Adelaide Season
30th October 2005

Scale
1:50

DAMIEN COOPER
Lighting Design

Apartment 5
65 Enfield Road
Adelaide, SA 5061
Mob: 0412 400 049
cooper27@mac.com



- ATOMIC SCROLLER COLOURS
- | | | |
|-----|--------|---------------------|
| 1. | R-00 | No Color/Open White |
| 2. | R-12 | Straw |
| 3. | R-09 | Pale Amber Gold |
| 4. | R-23 | Orange |
| 5. | R-26 | Red |
| 6. | R-309 | Broadway Pink |
| 7. | R-52 | Light Lavender |
| 8. | R-363 | Aquamarine |
| 9. | R-77 | Green Blue |
| 10. | R-88 | Light Green |
| 11. | R-2005 | Blue Grass |

Fixture	Qty	Power	Notes
1	1	1000W	
2	1	1000W	
3	1	1000W	
4	1	1000W	
5	1	1000W	
6	1	1000W	
7	1	1000W	
8	1	1000W	
9	1	1000W	
10	1	1000W	
11	1	1000W	

Weight of Elements:

VL3500 Spot	41kg	
Stage Cyclo	10.5kg	
Mac 700 Wash	32kg	
Source 4 26deg	8.8kg	
Atomic Strobe	7.5kg	
Scroller	2.5kg	
Atomic Strobe with Scroller	10kgs	
Sanyo HDT100 + Lens	20kg + 5kg	
Projector Bracket and Rigging	10kg	
Polyte S52 3m	45kg	
Flat web Truss 5m	21.5kg	CLS HD
Flat Web Truss 1m	5.2kg	CLS HD
Spigots and Bolts	13kgs	
Weight of Motors	125kg each	

Downstage Truss

2 x Mac 700 Wash	64	
4 x Atomic + Scroller	40	
3 x Source 4 26Deg	26.4	
2 x Sanyo HDT100L	50	
2 x Projector Bracket and Rigging	20	
4 x 3m Polyte Box Truss	180	
1/3 Total Flat Truss Weight?	167	- 203
Cable	20 Approx	
	567.4 KG	- 603.4

Mid-stage Truss

2 x Mac 700 Wash	64	
4 x Atomic + Scroller	40	
4 x Source 4 26Deg	35.2	
4 x 3m Polyte Box Truss	180	
1/3 Total Flat Truss Weight?	167	- 203
Cable	20 Approx	
	506.2 KG	- 542.2

Upstage Truss

2 x Mac 700 Wash	64	
4 x Atomic + Scroller	40	
4 x 3m Polyte Box Truss	180	
1/3 Total Flat Truss Weight?	167	- 203
Cable	25 Approx	
	476 KG	- 512

US VL LX Bar

2 x VL 3000Q spot	82	
Cable	5 Approx	
	87 KG	

US/DS Flat Truss:

5 x Martin Stage Cyclo

11m Flat Web Truss

Clamps and Yuppys

Cable

X 5 = Total Flat Truss

1/3

52.5

26.7 Approx

6

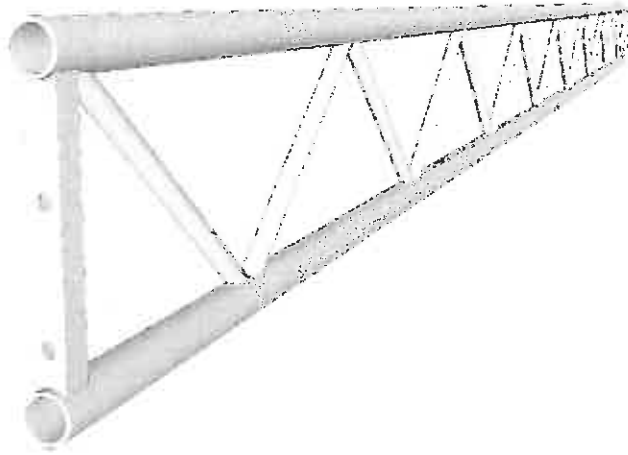
15 Approx

100.2 KG

501

167

5m 5m 1m
 48.2 (21.5 + 21.5 + 5.2)
 122 kg
 609
 203 per box driven



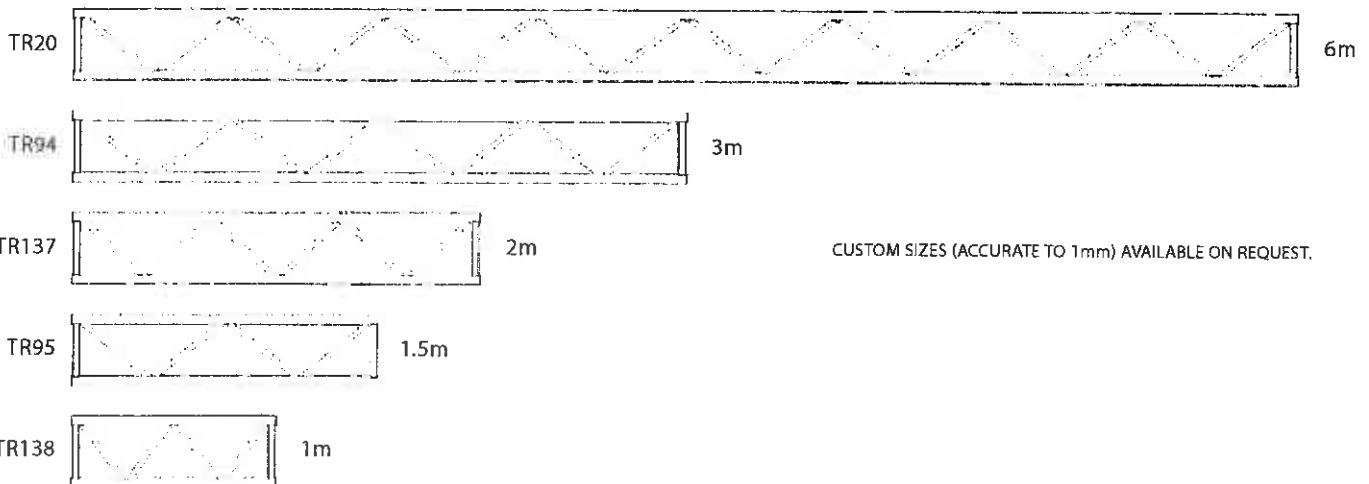
CLS HEAVY-DUTY FLAT-TRUSS

TR20 TR94 TR95 TR137 TR138

FEATURES:

CLS 300mm HEAVY-DUTY TRUSS IS DESIGNED FOR A COMBINATION OF SIMPLE FIXTURES AND BASIC MOVING FIXTURES (COLOUR-SCROLLERS ETC) IN A THEATRE CONTEXT. IT'S MADE FROM STRONGER SCAFFOLD-TUBE AND THE SAME WEBBING AS OUR 400 & 500mm BOX TRUSS PRODUCTS.

NOTE: - PICKUP NO MORE THAN EVERY FOUR METRES. SEE HANGING-BRACKETS PAGE FOR OPTIONS THAT BEST-GRIP THE TRUSS SAFELY FOR INSTALLATION AND ALSO MINIMISE LEAN AND SWINGING.
- FLAT-TRUSS IS ONLY STRUCTURAL WHEN KEPT AS CLOSE TO PERFECTLY VERTICAL AS PRACTICAL. IT MUST NOT BE USED HORIZONTALLY, OR HUNG FROM ANY FITTING THAT RENDERS IT OFF-AXIS. KEEP HEAVIER LOADS AS CLOSE AS POSSIBLE TO PICKUP-POINTS - THESE HELP KEEP THE TRUSS LEVEL AND RIGID. IF FLAT-TRUSS BEGINS TO BOW, DE-RIG IMMEDIATELY, AS IT BECOMES NO STRONGER THAN THE CHORD MATERIAL. RE-RIG ONLY ONCE IT HAS RETURNED TO ZERO-DEFLECTION.



CUSTOM SIZES (ACCURATE TO 1mm) AVAILABLE ON REQUEST.

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63-65 KINGSWAY, SOUTHBANK VIC 3006
ph 03 9682 6111 fax 03 9682 6777

info@clsa.com.au

60 EPSOM ROAD, ROSEBURY NSW 2018
ph 02 9697 2500 fax 02 9697 2522

ABN 14 005 422 319



CONCERT LIGHTING SYSTEMS AUSTRALIA

A.F. COLAFELLA

& Associates Pty Ltd

ACN 008 288 399

Consulting Structural & Civil Engineers
3/178 Barendse Road, Boronia 3155

Telephone: (03) 9752 6456
Fax: (03) 9761 1766

Project: 300 mm ALUMINIUM FLAT TRUSS

Page: SK 1

Ref: 4783

Client:

Designed: GN

Date: APR 2004

ALLOWABLE LOAD CHART (REFER NOTES BELOW)

SPAN (metres)	ALLOWABLE UNIFORM LOAD kg/m	ALLOWABLE POINT LOAD kgs	
3	124	187	SINGLE TRUSS SEGMENT NO RESTRAINT
3	500	780	SINGLE TRUSS SEGMENT MID - SPAN RESTRAINT
6	20	67	CONNECTED TRUSS SEGMENT MID - SPAN RESTRAINT



NOTES:

- 1.- ABOVE LOADS TAKEN FROM COMPUTATIONS & COMPUTER ANALYSIS CARRIED OUT IN ACCORDANCE WITH A.S. 1664 - ALUMINUM STRUCTURES CODE
- 2.- ABOVE LOADINGS ARE BASED ON INTERNAL USAGE ONLY
I.E. WIND LOADS NOT CONSIDERED.
- 3.- ALL MEMBERS CONSTRUCTED FROM GRADE 6061-T6 ALUMINUM ALLOY
- 4.- ALL WELDS TO BE MIN. 5mm FILLET WELDS FILLER ALLOY 5356
- 5.- ASSEMBLED TRUSS TO BE SUPPORTED ON EITHER TOP OR BOTTOM CHORDS AT EACH END.
- 6.- TRUSS SEGMENTS BOLTED TOGETHER USING 2 No 1/2" DIA. GRADE 8.8 TENSILE BOLTS TOP & BOTTOM.
- 7.- ALL LOADS SHOULD BE LOCATED AT PANEL POINTS i.e. THE INTERSECTION OF VERTICAL MEMBERS WITH THE HORIZONTAL CHORDS
- 8.- THE ASSEMBLED STRUCTURE IS TO BE ADEQUATELY BRACED SO AS TO PREVENT RACKING.
- 9.- THE LOADINGS SPECIFIED ABOVE ARE IN ADDITION TO THE SELF WEIGHT OF THE TRUSS
- 10.- DEFLECTION LIMITS HAVE NOT BEEN APPLIED IN COMBINING LOAD CHART
- 11.- MID - SPAN RESTRAINT TO BE APPLIED AT TOP CHORD FOR BOTH U.D.L. AND P.L. LOAD CASES AS NOTED IN CHART.

PROLYTE S52V / S52SV TRUSS

PROLYTE S52SV AND S52V - ALLOWABLE LOADING																	
SPAN		UNIFORMLY DISTRIBUTED LOAD		DEFLECTION		CENTRE POINT LOAD		DEFLECTION		MAXIMUM ALLOWABLE POINT LOADS						SPAN	
		kg/m	lb/ft			kg	lb			1FE	2FE	3FE	4FE	5FE	6FE		
m	ft	kg/m	lb/ft	mm	in	kg	lb	mm	in	kg	lb	kg	lb	kg	lb	kg	lb
2	6.6	2864,0	1927.1	2	0.07	5728,0	12641.6	2	0.07	2864,0	6320.8	1904,3	4202.8	1432,0	3160.4	30,0	
3	9.8	1904,3	1281.4	5	0.19	5193,9	11462.8	4	0.15	2856,5	6304.3	1896,8	4186.3	1428,2	3152.1	45,0	
4	13.1	1424,5	958.5	9	0.35	3882,3	8568.2	7	0.27	2849,0	6287.7	1889,3	4169.7	1424,5	3143.9	60,0	
5	16.4	1136,6	764.8	13	0.51	3092,3	6824.7	11	0.43	2319,2	5118.5	1546,2	3412.4	1283,3	2832.3	75,0	
6	19.7	854,4	574.9	19	0.74	2563,2	5656.9	15	0.59	1922,4	4242.7	1281,6	2826.5	1063,7	2347.6	90,0	
7	23.0	623,7	419.7	26	1.02	2183,1	4818.1	21	0.82	1637,3	3613.5	1091,5	2409.0	906,0	1999.5	105,0	
8	26.2	474,0	319.0	34	1.33	1896,1	4184.8	27	1.06	1422,1	3138.6	948,1	2092.4	786,9	1736.7	120,0	
9	29.5	371,4	249.9	43	1.69	1671,3	3688.5	35	1.37	1253,5	2766.4	835,6	1844.3	693,6	1530.7	135,0	
10	32.8	298,0	200.5	53	2.08	1489,9	3288.2	43	1.69	1117,4	2466.2	745,0	1644.1	618,3	1364.6	150,0	
11	36.1	243,7	164.0	65	2.55	1340,1	2957.7	52	2.04	1005,1	2218.3	670,1	1478.8	556,2	1227.4	165,0	
12	39.4	202,3	136.2	77	3.03	1214,1	2679.5	62	2.44	910,6	2009.6	607,0	1339.7	503,8	1112.0	180,0	
13	42.6	170,2	114.5	90	3.54	1106,3	2441.5	72	2.83	829,7	1831.2	553,1	1220.8	459,1	1013.2	195,0	
14	45.9	144,7	97.4	105	4.13	1012,8	2235.2	84	3.30	759,6	1676.4	506,4	1117.6	420,3	927.6	210,0	
15	49.2	124,1	83.5	120	4.72	930,8	2054.2	96	3.77	698,1	1540.7	465,4	1027.1	386,3	852.5	225,0	
16	52.5	107,3	72.2	137	5.39	858,1	1893.8	109	4.29	643,5	1420.3	429,0	946.9	356,1	785.9	240,0	
17	55.8	93,3	62.8	154	6.06	793,0	1750.2	123	4.84	594,8	1312.7	396,5	875.1	329,1	726.3	255,0	
18	59.0	81,6	54.9	173	6.81	734,4	1620.8	138	5.43	550,8	1215.6	367,2	810.4	304,8	672.6	270,0	
19	62.3	71,7	48.2	193	7.59	681,1	1503.3	154	6.06	510,9	1127.4	340,6	751.6	282,7	623.9	285,0	
20	65.6	63,2	42.6	214	8.42	632,5	1395.8	171	6.73	474,3	1046.9	316,2	697.9	262,5	579.3	300,0	
21	68.9	56,0	37.7	235	9.25	587,7	1297.0	188	7.40	440,8	972.8	293,8	648.5	243,9	538.3	315,0	
22	72.2	49,7	33.4	258	10.15	546,3	1205.7	207	8.14	409,7	904.3	273,2	602.9	226,7	500.4	330,0	
23	75.4	44,2	29.7	282	11.10	507,9	1120.9	226	8.89	380,9	840.7	253,9	560.5	210,8	465.2	345,0	
24	78.7	39,3	26.5	307	12.08	472,0	1041.8	246	9.68	354,0	781.4	236,0	520.9	195,9	432.3	360,0	

1 span = 78.4mm, 1 ton = 5.228 kg, 1 ton = 2204.62 lb

- Loading figures only valid for static loads and spans with two supporting points
- Spans must be supported at each end
- If dynamic loads or wind loads are involved, or more supporting points are applied, contact a structural engineer or Prolyte
- Loading figures are based on German DIN standards to comply with BS 7905-2 / ANSI E1.2-2006 / CWA 15902-2, the loading data must be multiplied by 0.85
- The self-weight of the trusses has already been taken into account
- For spans longer than indicated and with a different loading set-up use the KYLo programme
- For structures contact Prolyte



S52SV
Mark approval certificate No. 2993/05
Test report No. 2992/05
TUV certification only valid for loading table above.



S52V
Mark approval certificate No. 2991/05
Test report No. 2990/05
TUV certification only valid for loading table above.

PROLYTE S52F / S52V / S52SV TRUSS

TECHNICAL SPECIFICATIONS S52 SERIES

Types	Folding (F), Square (V)
Alloy	EN AW 6082 T6
Main tubes (chords)	50 x 4 mm
Braces	S52F - 25 x 3 mm S52V/SV - 30 x 3 mm
Coupling system	CCS7 series

Type		S52F	S52V	S52SV	
Allowable Normal Force in Main Chord	N	41,62	41,62	41,62	kN
Allowable Normal Force in Diagonals	N	16,59	20,36	20,36	kN
Surface area Complete Truss	A	23,12	23,12	23,12	cm ²
Moment of Inertia Y-axis	I _y	10906,2	10906,2	10906,2	cm ⁴
Moment of Inertia Z-axis	I _z	—	—	10906,2	cm ⁴
Allowable bending moment Y-axis	M _y	39,12	39,12	39,12	kNm
Allowable bending moment Z-axis	M _z	—	—	39,12	kNm
Allowable shear force Z-axis	Q _z /V _z	18,0	28,79	28,79	kN
Allowable shear force Y-axis	Q _y /V _y	—	—	28,79	kN
Selfweight	kg	12	15	15	kg/m

S52V / SV / S52F SERIES - STANDARD AVAILABLE LENGTHS AND CODES

Meters	Feet	Code*
0,25 / 1,00 m in steps of 5 mm	0.82' / 3.28' in steps of 0.2"	
0,50	1.64	S52V/•-L050
0,60	1.97	S52V/•-L060 S52F-L050
0,80	2.62	S52V/•-L080 S52F-L060
1,00	3.28	S52V/•-L100
1,20	3.94	S52V/•-L120 S52F-L120
1,50	4.57	S52V/•-L150
1,60	5.25	S52V/•-L160 S52F-L160
2,00	6.56	S52V/•-L200
2,40	7.87	S52V/•-L240 S52F-L240
2,50	8.20	S52V/•-L250
3,00	9.84	S52V/•-L300
3,20	10.50	S52V/•-L320
4,00	13.12	S52V/•-L400

*• = available F for Folding, V for Square with SV for Square truss with 4 sided webbing. Example: S52V-L100

Different levels of control to suit any application

Capacity (kg)	Type code			Speed (m/min)	Hoist duty cycle % ⁴	Nb of falls	Chain size (mm)	Motor power (kW)	Dimensions ² (mm)			Weight ³ (kg)	
	Version A - B - C and E		Version D						A	B	H	Hoist body	chain µm lift
	Standard ¹	Advanced safety											
	BGV-D8	BGV-D8+ ¹	BGV-C1 ²										
125	SM1 128M1			8	40		3.1x9.3	0,2	278	200	110	14	0,2
	SM5 1216M2	SM5 1216M2		16	40	1	4.8x12.5	0,45	401	247	135	27	0,55
250	SM2 254 M1			4	25	1	4x12	0,2	334	200	110	17	0,35
	SM5 254 M2			4	40	1	4.8x12.5	0,45	401	247	135	27	0,55
		SM5 254 M2		4	40	1	4.8x12.5	0,45	451	247	135	27	0,55
				4	40	1	4.8x12.5	0,85	401	247	135	27	0,55
				8	40	1	4.8x12.5	0,85	451	247	135	27	0,55
	SM5 2516 M1			16	25	1	4.8x12.5	0,85	401	247	135	27	0,55
500	SM5 504 M1			4	25	1	4.8x12.5	0,45	401	247	135	27	0,55
		SM10 504 M2	SM10 504 M2	4	40	1	6.8x17.8	0,9	588	283	175	52	1,22
	SM5 508 M1			8	25	1	4.8x12.5	0,85	401	247	135	27	0,55
		SM10 508 M2	SM10 508 M2	8	40	1	6.8x17.8	1,75	588	283	175	52	1,22
1000	SM10 5016 M1			16	25	1	6.8x17.8	1,75	481	283	175	48	1,22
		SM10 1002 M2	SM10 1002 M2	2	40	2	6.8x17.8	1,75	588	283	175	52	2,44
	SM10 1004 M1			4	25	1	6.8x17.8	0,9	481	283	175	48	1,22
		SM10 1004 M2	SM10 1004 M2	4	40	2	6.8x17.8	1,75	588	283	175	52	2,44
	SM10 1008 M1			8	25	1	6.8x17.8	1,75	481	283	175	48	1,22
1250		SM16 1008 B1		2/8	25	1	9x27	3.5/0.87	518	490	195	115	1,8
		SM25 1256 B2		1.6/6.3	40	1	11.3x31	3.5/0.87	518	490	195	115	2,85
	1600	SM16 1608 B1		2/8	25	1	9x27	3.5/0.87	518	351	195	100	1,8
		SM10 2002 M1		2	25	2	6.8x17.8	1,75	588	283	175	52	2,44
		SM10 2004 M1		4	25	2	6.8x17.8	1,75	588	283	175	52	2,44
2000		SM20 2004 B2		1/4	40	2	11.3x31	3.5/0.87	518	490	195	115	2,85
		SM20 2008 B1		2/8	25	2	11.3x31	3.5/0.87	518	351	195	110	2,85
2500		SM25 2503 B2		0.75/3.25	40	2	11.3x31	3.5/0.87	518	490	195	115	5,7
		SM25 2506 B1		1.6/6.3	25	1	11.3x31	3.5/0.87	518	351	195	110	2,85
5000		SM25 5003 B1		0.75/3.25	25	2	11.3x31	3.5/0.87	518	351	195	125	5,7

1 : Includes safety factor 10 and double brake.

2 : Includes safety factor 10, double brake, overload detection and special controls.

3 : Weight and sizes are indicative.

4 : Electric motors are min. 40% ID - 240 starts per hour.

- **Version A** : Cost effective direct control for rental and general rigging purposes.
- **Version B** : Low voltage control for fixed installations.
- **Version C** : Hoists for controllers with programmable presets.
- **Version D** : Controls in compliance to BGV-C1 code of praxis.
- **Version E** : Hoists without controls for external control integration.
- **Version F** : Cyberhoist, network controlled 3D programmable hoist.
- **Version V** : Hoists with built-in inverter for smooth speed control.
- **Version S** : Single phase power supply.

Versions A-B-C-E and V are also available in compliance with BGV-D8+ code of praxis.

