M+G Consulting

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18 May 2009

Attn. Mr Sherif Hanna
2 Prince Edward Road
Seaforth NSW 2092

Dear Sir,

Re. 2 Prince Edward Road, Seaforth – New Timber Deck
Our Ref. 3372

CERTIFICATE OF STRUCTURAL ADEQUACY

This is to certify that the structure of the new timber deck has been constructed in accordance with relevant structural requirements of the BCA and following relevant current Australian Structural Standards:

AS/NZS1170.0, AS/NZS1170.1, AS1684, AS 1720.1, AS3600

We confirm that at the time of our inspection the deck was structurally adequate in accordance with the above Australian Structural Standards.

This certificate is based on our inspection 16 May 2009 as detailed on our Site Inspection Report (attached).

This certification shall not be construed as relieving any other party of their responsibilities, liabilities or contractual obligations.

Yours faithfully
M+G Consulting

Simon Matthews
CPEng, NPER No. 251846

Attached

(B) 865 mm above the floor of a *landing* to a stair or ramp where the balustrade or other barrier is provided along the inside edge of the *landing* and is not more than 500 mm long.

(b) A transition zone may be incorporated where the balustrade or other barrier height changes from 865 mm on the stair *flight* or ramp to 1 m at the *landing* (see Figure 3.9.2.2).

(c) Openings in balustrades (including decorative balustrades) or other barriers must be constructed so that any opening does not permit a 125 mm sphere to pass through it and for stairs, the space is tested above the nosing line.

(d) A balustrade or other barrier must be designed to take loading forces in accordance with AS 1170.1 or AS/NZS 1170.1.

(e) For floors more than 4 m above the surface beneath, any horizontal elements within the balustrade or other barrier between 150 mm and 760 mm above the floor must not facilitate climbing.

(f) A wire balustrade must be constructed in accordance with the following and is deemed to meet the requirements of (c):

(i) For horizontal wire systems—

(A) when measured with a strain indicator, it must be in accordance with the tension values in **Table 3.9.2.1**; or

(B) must not exceed the maximum deflections in **Table 3.9.2.1**.

(ii) For non-continuous vertical wire systems, when measured with a strain indicator, must be in accordance with the tension values in **Table 3.9.2.1**.

(iii) For continuous vertical or continuous near vertical sloped wire systems—

(A) must have wires of no more than 2.5 mm diameter with a lay of 7x7 or 7x19 construction; and

(B) changes in direction at support rails must pass around a pulley block without causing permanent deformation to the wire; and

(C) must have supporting rails, constructed with a spacing of not more than 800 mm, of a material that does not allow deflection that would decrease the tension of the wire under load; and

(D) when the wire tension is measured with a strain indicator, it must be in accordance with the tension values in **Table 3.9.2.2** and measured in the furthermost span from the tensioning device.

Explanatory Information:

1. For the purpose of this clause, a wire balustrade consist of a series of tensioned wire rope connected to either vertical or horizontal supports serving as a guard to minimise the risk of a person falling from a roof, stairway, raised floor level or the like.
2. A wire balustrade excludes wire mesh fences and the like.
3. To assist in the application of 3.9.2.3(f), the following terms have been defined:
   (a) Continuous — where the wire spans three or more supports.

(b) Non-continuous — where the wire only spans between two supports.
(c) Pulley block — a device consisting of a wheel in which a wire runs around to change its direction.
(d) Permissible deflection — is the allowable bending of the wire.
(e) Support rails — are horizontal components of the balustrade system that span across the top and bottom to provide structural support.

4. **Tables 3.9.2.1** and **3.9.2.2** contains tension and deflection requirements for wires in vertical and horizontal wire balustrades systems with varying post spacings, wire spacings and wire types. The figures contained in the table were derived from testing the spacing combinations in order to prevent the passage of a 125 mm diameter solid cone penetrating between the wires at a predetermined force.
5. Care needs to be taken to ensure that wire tension will be maintained during the life of the balustrade. In some situations, it may be necessary to incorporate "lock-off" devices to prevent to loosening of the wire.
6. Likewise, if a threaded anchor bears against a soft wood post or rail, the anchor may indent the post or rail, thus loosening the wire.
7. Temperature effects on the tension of the wire may be significant but there is little that can be done to allow for temperature variation in service. The shorter the wire span, the lesser the effect will be.
8. Stainless steel wire with a lay of 1 x 19 has the greatest elastic modulus and will take up the same load with less extension than equivalent wires with other lays.

Table 3.9.2.1 WIRE BALUSTRADE CONSTRUCTION - REQUIRED WIRE TENSION (T) AND MAXIMUM PERMISSIBLE DEFLECTION (D)

Support (post or rail) Spacing (mm)		Stainless Steel Wire													Galvanised Steel Wire		
		Wire Diameter (mm) and Lay															
		2.5	2.5			3.0			3.0	4.0	4.0			4.0	3.25		
		7 x 7	1 x 19			1 x 19			7 x 7	7 x 7	7 x 19			1 x 19	1 x 6		
		Wire Spacing (mm)															
		60	60	80	100	60	80	100	60	60	60	80	100	60	60	80	100
600	T	6	35	420	1140	25	325	1090	81	29	155	394	1038	6	45	240	1060
	D	20	20	9	2	19	8	2	19	18	18	8	3	18	30	10	3
800	T	198	218	630	1565	183	555	1500	242	213	290	654	1412	127	140	537	1540
	D	13	13	7	2	16	6	2	16	14	14	7	3	14	23	7	3
900	T	294	310	735	N/A	261	670	1705	323	242	358	785	1598	242	188	685	1780
	D	11	11	5	N/A	13	6	2	13	12	12	6	3	12	20	6	3
1000	T	390	402	840	N/A	340	785	1910	404	329	425	915	1785	358	235	853	N/A
	D	10	10	5	N/A	11	6	2	11	10	10	5	3	10	17	6	N/A
1200	T	583	585	1050	N/A	520	1015	N/A	525	519	599	1143	2165	525	435	1190	N/A
	D	9	9	5	N/A	8	6	N/A	8	8	8	4	2	8	13	6	N/A
1500	T	860	810	1400	N/A	790	1330	N/A	681	785	860	1485	2735	785	735	N/A	N/A
	D	8	8	5	N/A	7	5	N/A	7	8	8	4	2	8	10	N/A	N/A
1800	T	1100	1125	1750	N/A	1025	1725	N/A	980	1050	1080	1860	N/A	1000	1150	N/A	N/A
	D	8	8	N/A	N/A	7	5	N/A	7	7	8	4	N/A	8	10	N/A	N/A
2000	T	1229	1325	N/A	N/A	1180	1980	N/A	1171	1188	1285	2105	N/A	1090	N/A	N/A	N/A
	D	8	8	N/A	N/A	7	5	N/A	7	7	7	4	N/A	7	N/A	N/A	N/A

Table 3.9.2.1 WIRE BALUSTRADE CONSTRUCTION - REQUIRED WIRE TENSION (T) AND MAXIMUM PERMISSIBLE DEFLECTION (D) (Continued)

2500	T	1581	N/A	N/A	N/A	N/A	N/A	N/A	1483	1719	1540	2615	N/A	1488	N/A	N/A	N/A
	D	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	7	7	4	N/A	7	N/A	N/A	N/A

Notes:

1. Tension (T) = when measured with a strain indicator the minimum required tension of the wire balustrades in Newtons (N)
2. Deflection (D) = maximum permissible deflection in (mm) of the wire balustrades when a 2 kg mass is suspended mid-span between the posts
3. Lay = number of strands by the number of individual wires in each strand. For example 7 x 19 = 7 strands, each with 19 individual wires in each strand
4. Galvanised Steel Wire is only to be used in straight run applications
5. Where a change of direction is made in the run of a wire , the tensioning device is to be placed at the end of the longest span.
6. N/A = wire balustrades not allowed in this situation

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SITE INSPECTION REPORT

Project:	2 Prince Edward St Grafton	Date:	16/5/09
Work Observed:	Completed Timber Balcony	Job No.:	3372.
Requested by:	Sherif Hanna	Report No.:	#1.

1) Inspection undertaken of completed balcony.

2) Ensure all wires to balustrade are correctly tensioned in accordance with the BCA requirements. (attached to this site instruction)

If the contractor considers that the execution of any work resulting from these instructions involves a variation, he shall obtain approval, as the contract requires.

Contractor's Representative:

M+G Consulting's Representative: