PREDICTION OF DEFORMATIONS IN POST-TENSIONED PRESTRESSED SUSPENDED SLABS IN TALL BUILDINGS

Thomas J. Vincent
B.E. Civil Engineering (Hons.)

A thesis submitted in fulfilment
of the requirements for the degree of
Master of Engineering

at

The University of Adelaide
(Faculty of Engineering)

July 2008

APPENDICES

Appendices to the thesis submitted in fulfillment
of the requirements for the degree of
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APPENDIX A

Long Term Deflection Prediction Method Proposed by Hwang and Chang (1996).

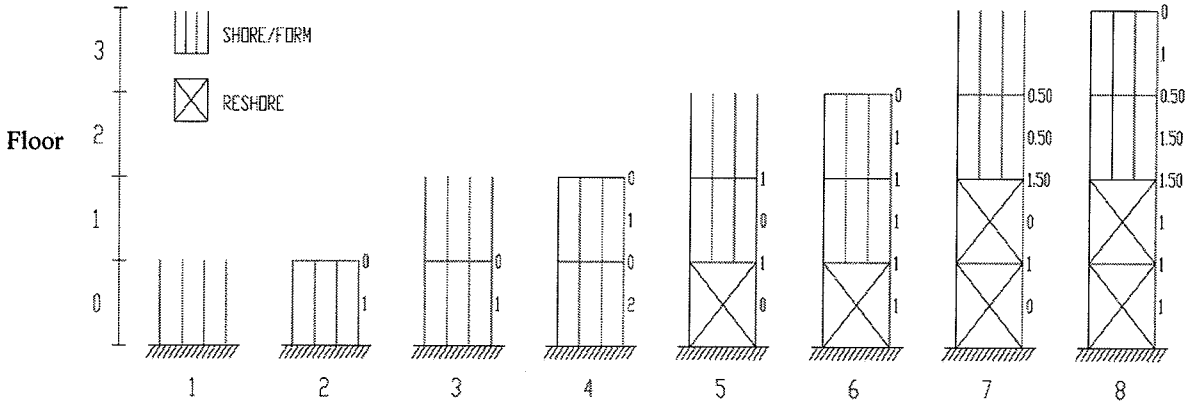
APPENDIX B

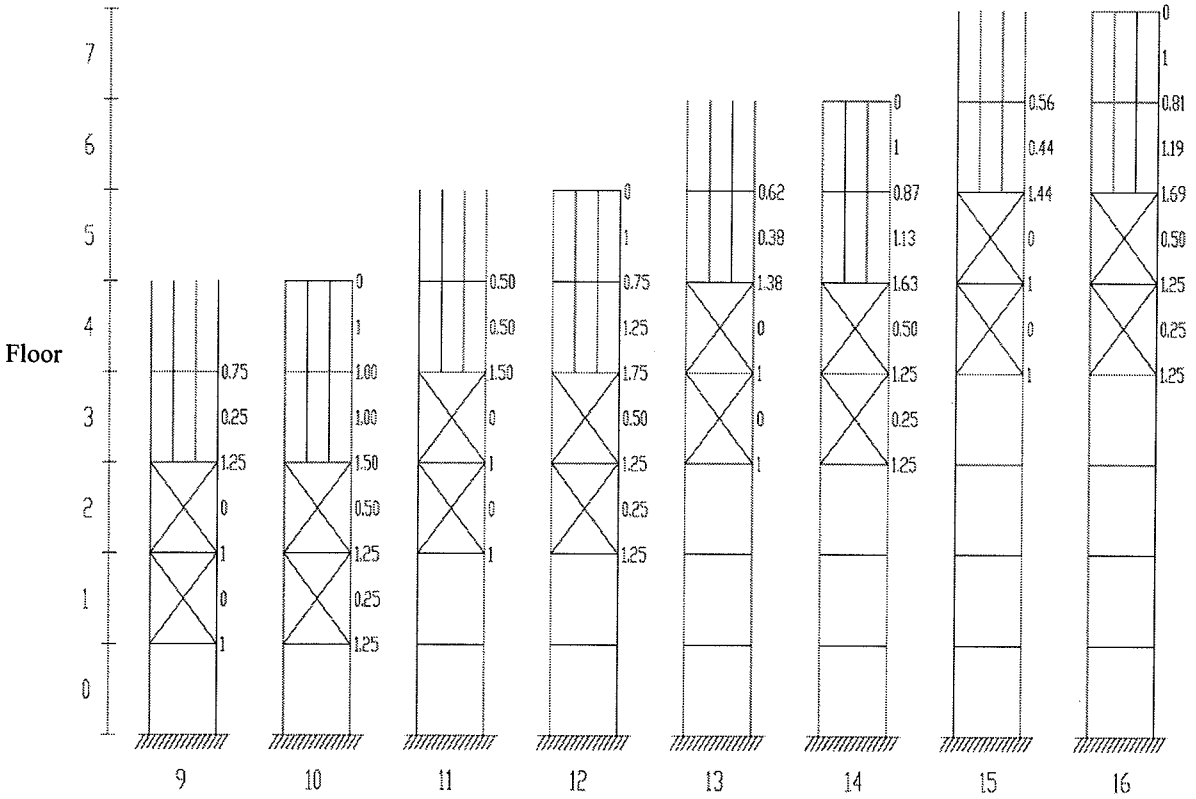
Examples of modeling construction effect of propping and back propping by the use of load factors (k) from J.F.M.A. Prado et al (2003).

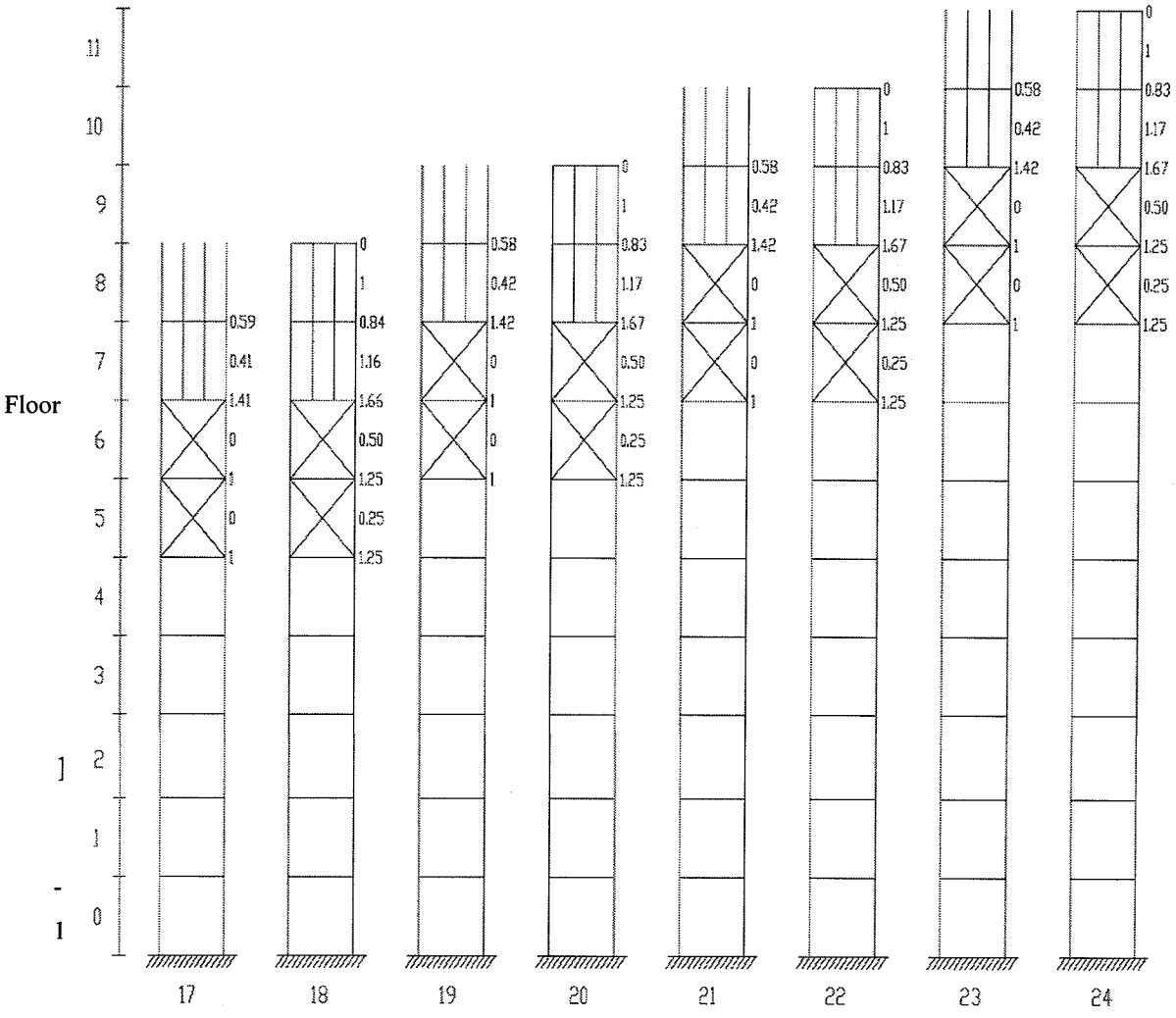
Examples of modeling construction effect of propping and back propping by the use of load factors (k) from J.F.M.A. Prado et al (2003).

Load factors (k) for floors and props (2 + 2 propping and back propping scheme)

Where; $k = \frac{\text{loading on the floor (or on the props)}}{\text{Self weight of the floor}}$





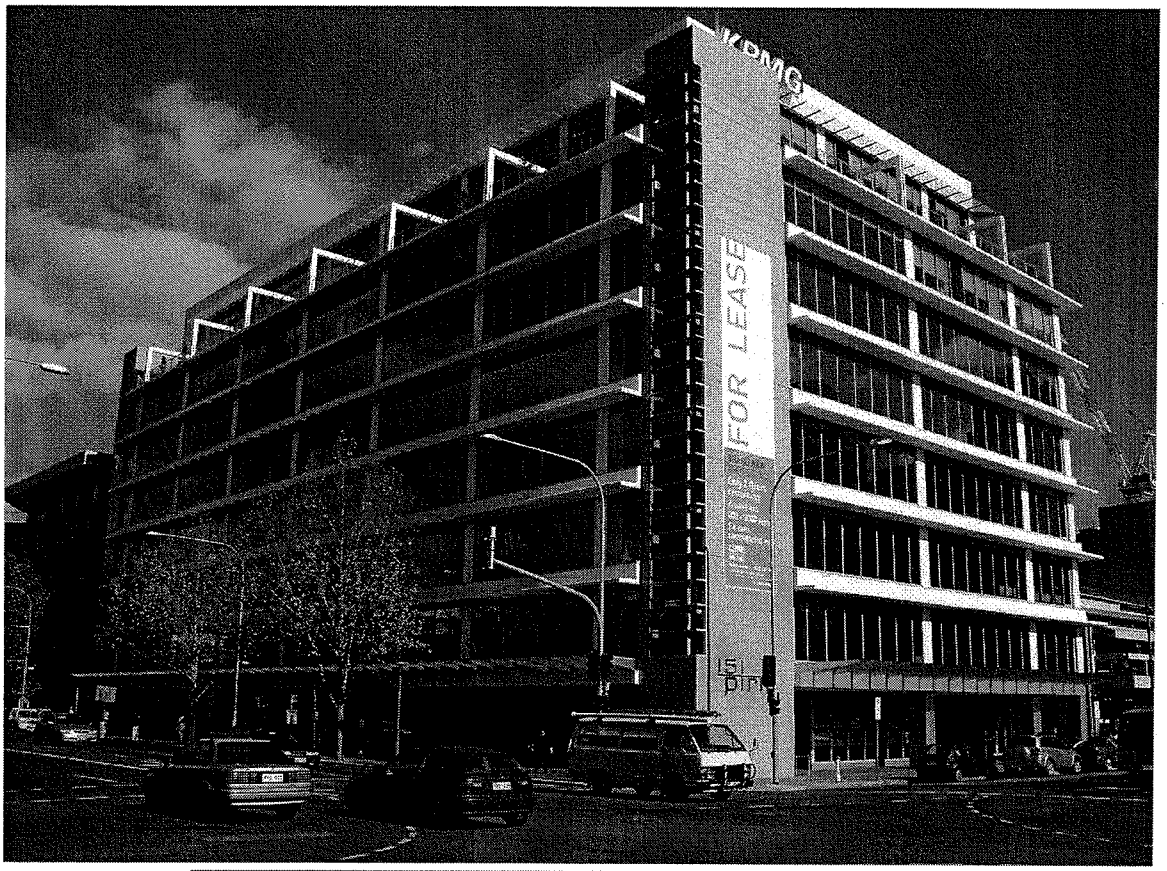

Floor
11
10
9
8
7
6
5
4
3
2
1
0
-1
0.59
0.41
1.41
0
1
0
1
0
1
0.84
1.16
1.66
0.50
1.25
0.25
1.25
0.58
0.42
1.42
0.83
1.17
1.67
0.50
1.25
0.25
1.25
0.58
0.42
1.42
0.83
1.17
1.67
0.50
1.25
0.25
1.25
17
18
19
20
21
22
23
24
Construction Stage

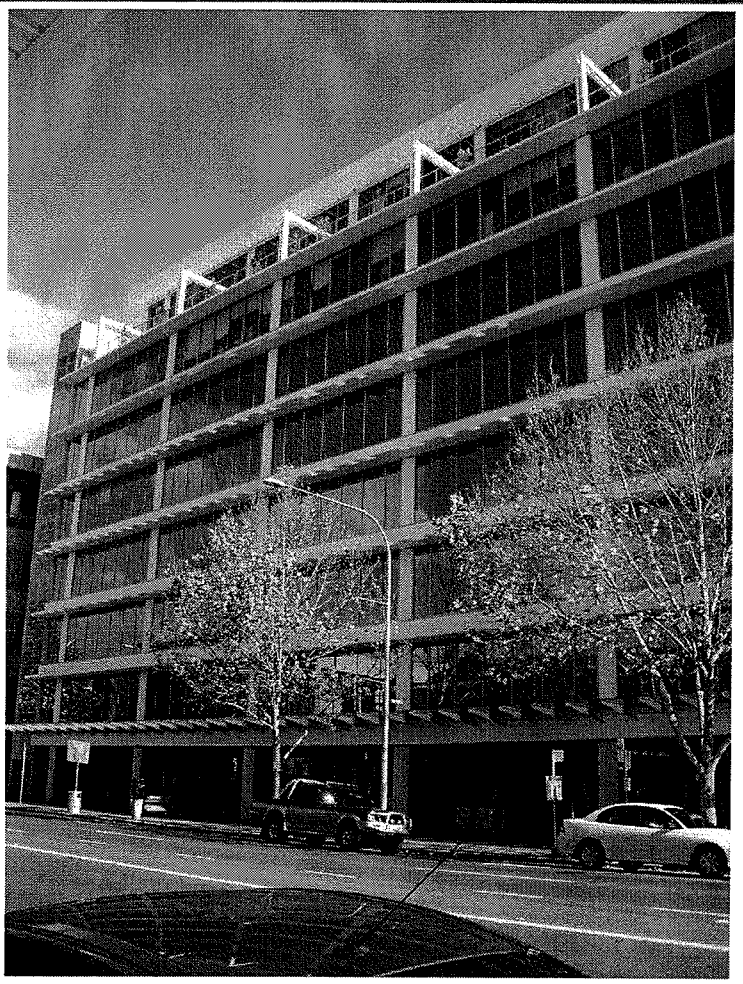
APPENDIX C

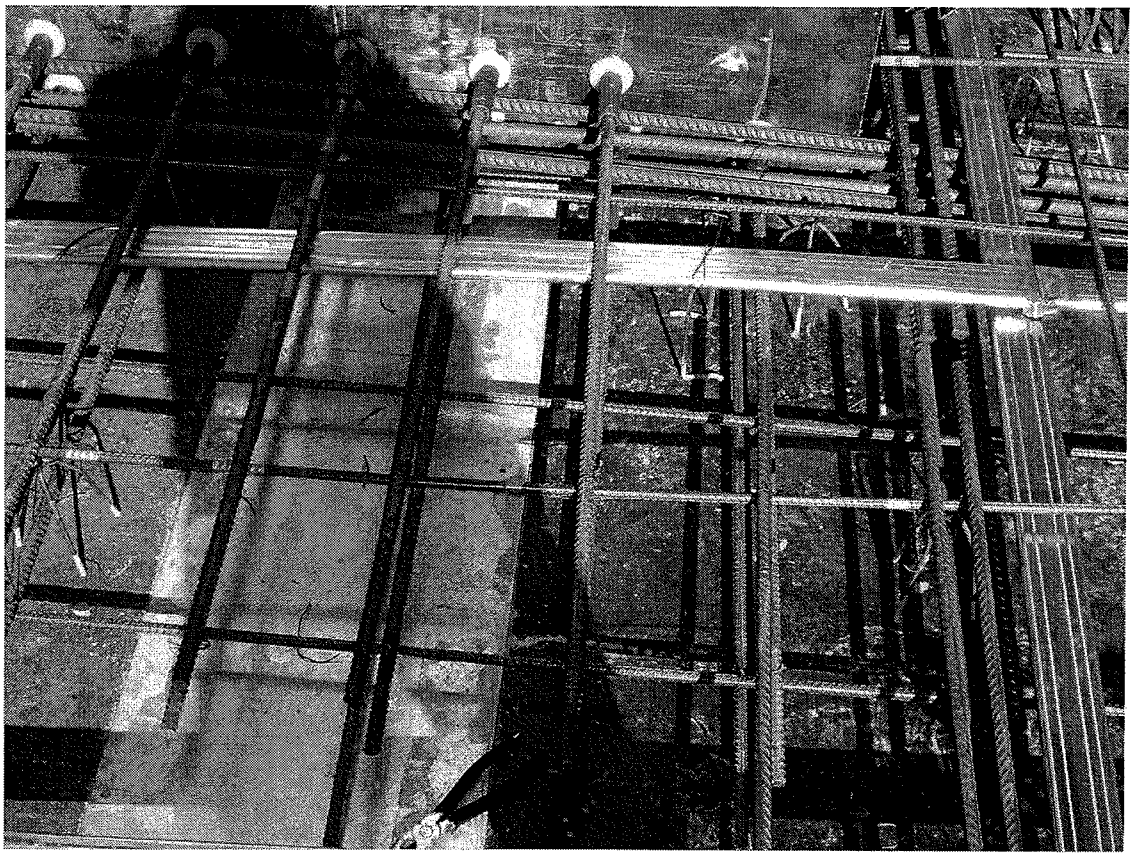
151 Pirie Structural Plans Incorporating Photos of Slab Details.

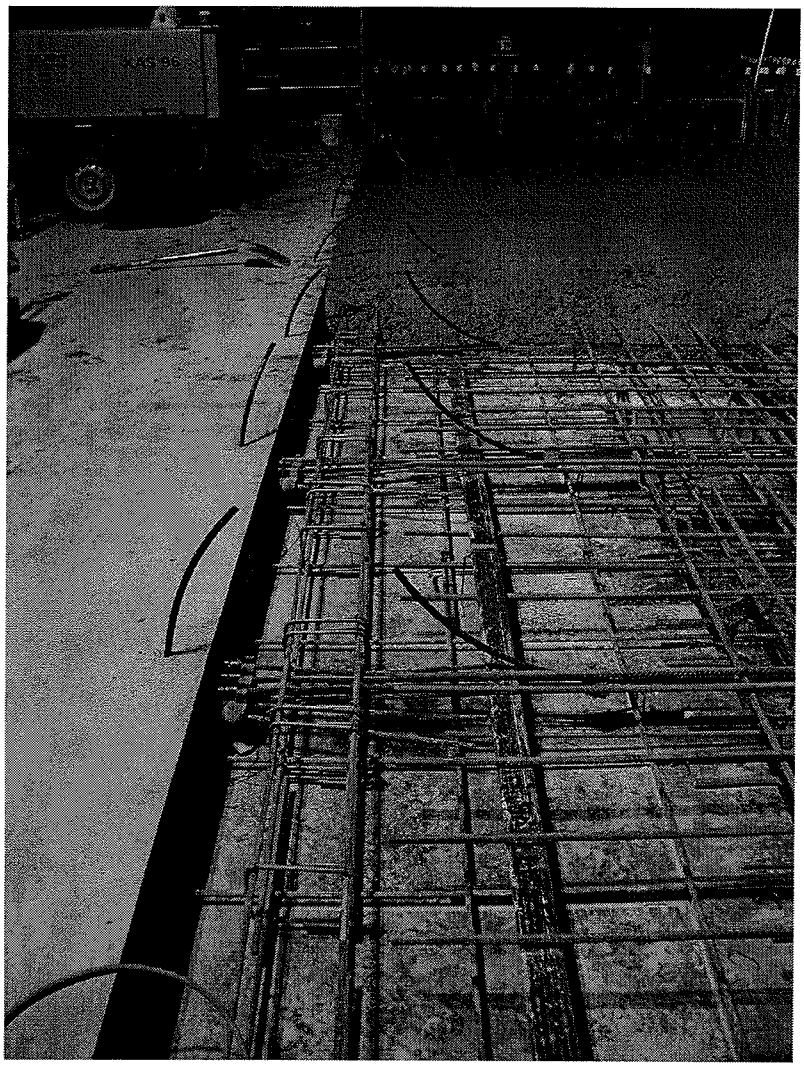
- Take note that the building was labelled as Admiral House during the design stages, the name change to 151 Pirie occurred after these plans were completed.

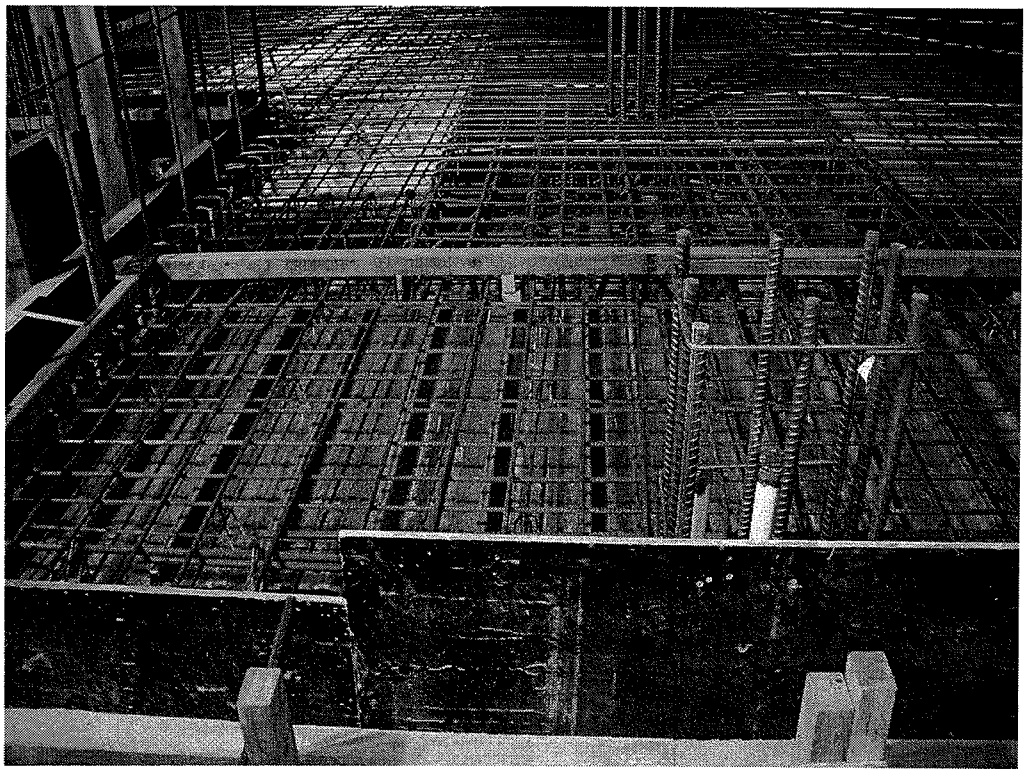
NOTE:
The structural plans (6 pages) in this appendix are included in the print copy of the thesis held in the University of Adelaide Library.


KPMG
FOR LEASE









APPENDIX D

Concrete Mixtures and Slab Pour Details.

Slab pour details for R and D project on Admiral House

Date	Level	Pour	Product code	Docket number		Time Btchd	Time SmpId	Truck #	Load size (m^3)	Temp (Deg C) conc	Temp (Deg C) amb	Slump (mm) target	Slump (mm) actual
11-May-05	1	South	N322F	7872		5.32						80	95
20-May-05	1	North	N322F	7872	6752	5.41	6.35	662	5.8	18	15	80	85
30-May-05	2	South	N322F	7872	7206	5.31		668		16	6	80	85
6-Jun-05	2	North	N322F	7872	7651	5.41		653		17	15	80	85
17-Jun-05	3	South	N402F	7872	8070	5.50	6.40	664	7.2	16	11		110
25-Jun-05	3	North	N322F	7872		5.35	6.15	684	7.2	19	10	80	85
6-Jul-05	4	South	N402F	7872		5.54	~6.25		7.2	16	8	80	85
13-Jul-05	4	North	N402F	7872	9059	3.34	4.10	668	7.2	15	7	80	85
22-Jul-05	5	South	N402F	7872					7.2			80	
27-Jul-05	5	Pour missed due to programming and placing thermocouples											
5-Aug-05	6	Pour missed due to programming and placing thermocouples											
10-Aug-05	6	North	N402F	7872	0876	3.38	4.35	684	7.2	15	9	90	85
19-Aug-05	7	South	N402F	7873	1319	4.02	4.45	664	7.2	18	14	80	95
	7	Pour missed due to a hasty change in construction timing without research notification											

Refer to order number P104257 or job number 62 for more details.

Details of concrete pour absent

2 litres/m^3 of accelerator added (daraset AF, from Grace) which only affects v v early strength gain I.e.<5hours

Details of concrete supplied to the construction site of 151 Pirie for the partially prestressed suspended slabs.

		LoadSize		Time		Temp (deg C)		Slump (mm)	
DateCast	Truck	(m3)	Location	Batched	Sampled	Conc	Air	Design	Measured
11/5/2005	8664	7.2	Level 1 Pour 1	4:20 AM	5:00 AM	21	9	80	75
11/5/2005	8664	7.2	Level 1 Pour 1	4:20 AM	5:00 AM	21	9	80	75
11/5/2005	8664	7.2	Level 1 Pour 1	4:20 AM	5:00 AM	21	9	80	75
11/5/2005	8662	5.8	Level 1 Pour 1	4:58 AM	5:25 AM	21	10	80	85
11/5/2005	8662	5.8	Level 1 Pour 1	4:58 AM	5:25 AM	21	10	80	85
11/5/2005	8662	5.8	Level 1 Pour 1	4:58 AM	5:25 AM	21	10	80	85
11/5/2005	8662	5.8	Level 1 Pour 1	6:05 AM	6:45 AM	20	12	80	95
11/5/2005	8662	5.8	Level 1 Pour 1	6:05 AM	6:45 AM	20	12	80	95
11/5/2005	8662	5.8	Level 1 Pour 1	6:05 AM	6:45 AM	20	12	80	95
11/5/2005	8656	5.8	Level 1 Pour 1	6:38 AM	7:15 AM	20	12	80	80
11/5/2005	8656	5.8	Level 1 Pour 1	6:38 AM	7:15 AM	20	12	80	80
11/5/2005	8656	5.8	Level 1 Pour 1	6:38 AM	7:15 AM	20	12	80	80
11/5/2005	8662	5.8	Level 1 Pour 1	7:06 AM	7:50 AM	20	12	80	85
11/5/2005	8662	5.8	Level 1 Pour 1	7:06 AM	7:50 AM	20	12	80	85
11/5/2005	8662	5.8	Level 1 Pour 1	7:06 AM	7:50 AM	20	12	80	85
11/5/2005	8662	5.8	Level 1 Pour 1	7:06 AM	7:50 AM	20	12	80	85
11/5/2005	8662	5.8	Level 1 Pour 1	7:06 AM	7:50 AM	20	12	80	85
11/5/2005	8662	5.8	Level 1 Pour 1	7:06 AM	7:50 AM	20	12	80	85
11/5/2005	8662	5.8	Level 1 Pour 1	7:06 AM	7:50 AM	20	12	80	85
11/5/2005	8662	5.8	Level 1 Pour 1	7:06 AM	7:50 AM	20	12	80	85
11/5/2005	8662	5.8	Level 1 Pour 1	7:06 AM	7:50 AM	20	12	80	85
20/05/2005	8688	7.2	Level 1 Pour 2	4:33 AM	5:10 AM	18	15	80	70
20/05/2005	8688	7.2	Level 1 Pour 2	4:33 AM	5:10 AM	18	15	80	70
20/05/2005	8688	7.2	Level 1 Pour 2	4:33 AM	5:10 AM	18	15	80	70
20/05/2005	8672	10	Level 1 Pour 2	5:16 AM	5:55 AM	18	16	80	100
20/05/2005	8672	10	Level 1 Pour 2	5:16 AM	5:55 AM	18	16	80	100
20/05/2005	8672	10	Level 1 Pour 2	5:16 AM	5:55 AM	18	16	80	100
20/05/2005	8687	7.2	Level 1 Pour 2	5:57 AM	7:30 AM	19	15	80	90
20/05/2005	8687	7.2	Level 1 Pour 2	5:57 AM	7:30 AM	19	15	80	90
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20/05/2005	8607	5.8	Level 1 Pour 2	7:07 AM	8:05 AM	18	15	80	70
20/05/2005	8607	5.8	Level 1 Pour 2	7:07 AM	8:05 AM	18	15	80	70
20/05/2005	8607	5.8	Level 1 Pour 2	7:07 AM	8:05 AM	18	15	80	70
20/05/2005	8607	5.8	Level 1 Pour 2	7:07 AM	8:05 AM	18	15	80	70
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20/05/2005	8662	5.8	Level 1 Pour 2	5:25 AM	6:35 AM	18	15	80	85
20/05/2005	8662	5.8	Level 1 Pour 2	5:25 AM	6:35 AM	18	15	80	85
30/05/2005	8691	5.8	Level 2 Pour 1	4:28 AM	5:15 AM	16	9	80	80
30/05/2005	8691	5.8	Level 2 Pour 1	4:28 AM	5:15 AM	16	9	80	80
30/05/2005	8691	5.8	Level 2 Pour 1	4:28 AM	5:15 AM	16	9	80	80
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30/05/2005	8653	5.8	Level 2 Pour 1	4:57 AM	6:05 AM	16	8	80	80
30/05/2005	8653	5.8	Level 2 Pour 1	4:57 AM	6:05 AM	16	8	80	80

30/05/2005	8486	7.2	Level 2 Pour 1	5:49 AM	7:15 AM	15	7	80	85
30/05/2005	8486	7.2	Level 2 Pour 1	5:49 AM	7:15 AM	15	7	80	85
30/05/2005	8486	7.2	Level 2 Pour 1	5:49 AM	7:15 AM	15	7	80	85
30/05/2005	8684	7.2	Level 2 Pour 1	8:35 AM	9:20 AM	18	13	80	85
30/05/2005	8684	7.2	Level 2 Pour 1	8:35 AM	9:20 AM	18	13	80	85
30/05/2005	8684	7.2	Level 2 Pour 1	8:35 AM	9:20 AM	18	13	80	85
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30/05/2005	8684	7.2	Level 2 Pour 1	9:29 AM	10:20 AM	17	15	80	75
30/05/2005	8684	7.2	Level 2 Pour 1	9:29 AM	10:20 AM	17	15	80	75
30/05/2005	8684	7.2	Level 2 Pour 1	9:29 AM	10:20 AM	17	15	80	75
30/05/2005	8684	7.2	Level 2 Pour 1	9:29 AM	10:20 AM	17	15	80	75
30/05/2005	8684	7.2	Level 2 Pour 1	9:29 AM	10:20 AM	17	15	80	75
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6/6/2005	8664	7.2	Level 2 Pour 2	4:25 AM	5:15 AM	16	14	80	95
6/6/2005	8664	7.2	Level 2 Pour 2	4:25 AM	5:15 AM	16	14	80	95
6/6/2005	8688	7.2	Level 2 Pour 2	5:13 AM	5:50 AM	17	15	80	80
6/6/2005	8688	7.2	Level 2 Pour 2	5:13 AM	5:50 AM	17	15	80	80
6/6/2005	8688	7.2	Level 2 Pour 2	5:13 AM	5:50 AM	17	15	80	80
6/6/2005	8664	7.2	Level 2 Pour 2	6:33 AM	7:30 AM	17	15	80	75
6/6/2005	8664	7.2	Level 2 Pour 2	6:33 AM	7:30 AM	17	15	80	75
6/6/2005	8664	7.2	Level 2 Pour 2	6:33 AM	7:30 AM	17	15	80	75
6/6/2005	8688	7.2	Level 2 Pour 2	6:00 AM	8:00 AM	17	15	80	75
6/6/2005	8688	7.2	Level 2 Pour 2	6:00 AM	8:00 AM	17	15	80	75
6/6/2005	8688	7.2	Level 2 Pour 2	6:00 AM	8:00 AM	17	15	80	75
6/6/2005	8688	7.2	Level 2 Pour 2	6:00 AM	8:00 AM	17	15	80	75
6/6/2005	8688	7.2	Level 2 Pour 2	6:00 AM	8:00 AM	17	15	80	75
6/6/2005	8688	7.2	Level 2 Pour 2	6:00 AM	8:00 AM	17	15	80	75
6/6/2005	8688	7.2	Level 2 Pour 2	6:00 AM	8:00 AM	17	15	80	75
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17/06/2005	8688	7.2	Level 3 Pour 1	4:34 AM	5:30 AM	15	10	80	95
17/06/2005	8688	7.2	Level 3 Pour 1	4:34 AM	5:30 AM	15	10	80	95
17/06/2005	8688	7.2	Level 3 Pour 1	5:31 AM	6:05 AM	16	10	80	95
17/06/2005	8688	7.2	Level 3 Pour 1	5:31 AM	6:05 AM	16	10	80	95
17/06/2005	8688	7.2	Level 3 Pour 1	5:31 AM	6:05 AM	16	10	80	95
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17/06/2005	8687	7.2	Level 3 Pour 1	7:31 AM	8:40 AM	16	10	80	95
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25/06/2005	8684	7.2	Level 3 Pour 2	5:32 AM	6:15 AM	19	10	80	85
25/06/2005	8684	7.2	Level 3 Pour 2	5:32 AM	6:15 AM	19	10	80	85
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25/06/2005	8465	7.2	Level 3 Pour 2	6:28 AM	7:25 AM	21	12	80	90
25/06/2005	8465	7.2	Level 3 Pour 2	6:28 AM	7:25 AM	21	12	80	90
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25/06/2005	8465	7.2	Level 3 Pour 2	6:28 AM	7:25 AM	21	12	80	90
25/06/2005	8465	7.2	Level 3 Pour 2	6:28 AM	7:25 AM	21	12	80	90
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7/6/2005	8664	7.2	Level 4 Pour 1	4:31 AM	5:05 AM	17	9	80	75
7/6/2005	8664	7.2	Level 4 Pour 1	4:31 AM	5:05 AM	17	9	80	75
7/6/2005	8691	5.6	Level 4 Pour 1	5:11 AM	6:25 AM	16	8	80	85
7/6/2005	8691	5.6	Level 4 Pour 1	5:11 AM	6:25 AM	16	8	80	85
7/6/2005	8691	5.6	Level 4 Pour 1	5:11 AM	6:25 AM	16	8	80	85
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7/6/2005	8465	7.2	Level 4 Pour 1	5:53 AM	6:40 AM	16	8	80	85
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7/6/2005	8486	7.2	Level 4 Pour 1	8:24 AM	9:20 AM	21	12	80	95
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7/6/2005	8486	7.2	Level 4 Pour 1	8:24 AM	9:20 AM	21	12	80	95
7/6/2005	8486	7.2	Level 4 Pour 1	9:28 AM	10:25 AM	21	13	80	90
7/6/2005	8486	7.2	Level 4 Pour 1	9:28 AM	10:25 AM	21	13	80	90
7/6/2005	8486	7.2	Level 4 Pour 1	9:28 AM	10:25 AM	21	13	80	90
7/6/2005	8486	7.2	Level 4 Pour 1	9:28 AM	10:25 AM	21	13	80	90
7/6/2005	8486	7.2	Level 4 Pour 1	9:28 AM	10:25 AM	21	13	80	90
7/6/2005	8486	7.2	Level 4 Pour 1	9:28 AM	10:25 AM	21	13	80	90
7/6/2005	8486	7.2	Level 4 Pour 1	9:28 AM	10:25 AM	21	13	80	90
13/07/2005	8668	7.2	Level 4 Pour 2	3:31 AM	4:10 AM	15	7	80	85
13/07/2005	8668	7.2	Level 4 Pour 2	3:31 AM	4:10 AM	15	7	80	85
13/07/2005	8668	7.2	Level 4 Pour 2	3:31 AM	4:10 AM	15	7	80	85
13/07/2005	8663	5.6	Level 4 Pour 2	4:22 AM	4:55 AM	15	7	80	85
13/07/2005	8663	5.6	Level 4 Pour 2	4:22 AM	4:55 AM	15	7	80	85
13/07/2005	8663	5.6	Level 4 Pour 2	4:22 AM	4:55 AM	15	7	80	85
13/07/2005	8663	5.6	Level 4 Pour 2	5:14 AM	6:00 AM	16	9	80	95
13/07/2005	8663	5.6	Level 4 Pour 2	5:14 AM	6:00 AM	16	9	80	95
13/07/2005	8663	5.6	Level 4 Pour 2	5:14 AM	6:00 AM	16	9	80	95
13/07/2005	8663	5.6	Level 4 Pour 2	5:14 AM	6:00 AM	16	9	80	95
13/07/2005	8663	5.6	Level 4 Pour 2	5:14 AM	6:00 AM	16	9	80	95
13/07/2005	8663	5.6	Level 4 Pour 2	5:14 AM	6:00 AM	16	9	80	95
13/07/2005	8663	5.6	Level 4 Pour 2	5:14 AM	6:00 AM	16	9	80	95
22/07/2005	8653	5.8	Level 5 Pour 1	2:32 AM	3:05 AM	15	13	80	70
22/07/2005	8653	5.8	Level 5 Pour 1	2:32 AM	3:05 AM	15	13	80	70
22/07/2005	8653	5.8	Level 5 Pour 1	2:32 AM	3:05 AM	15	13	80	70
22/07/2005	8689	7.2	Level 5 Pour 1	3:07 AM	3:49 AM	15	13	80	95
22/07/2005	8689	7.2	Level 5 Pour 1	3:07 AM	3:49 AM	15	13	80	95
22/07/2005	8689	7.2	Level 5 Pour 1	3:07 AM	3:49 AM	15	13	80	95
22/07/2005	8688	7.2	Level 5 Pour 1	4:00 AM	4:20 AM			80	90
22/07/2005	8688	7.2	Level 5 Pour 1	4:00 AM	4:20 AM			80	90
22/07/2005	8688	7.2	Level 5 Pour 1	4:00 AM	4:20 AM			80	90
22/07/2005	8465	7.2	Level 5 Pour 1	4:41 AM	5:40 AM	15	13	80	80
22/07/2005	8465	7.2	Level 5 Pour 1	4:41 AM	5:40 AM	15	13	80	80
22/07/2005	8465	7.2	Level 5 Pour 1	4:41 AM	5:40 AM	15	13	80	80
22/07/2005	8486	7.2	Level 5 Pour 1	5:11 AM	6:05 AM	15	13	80	85
22/07/2005	8486	7.2	Level 5 Pour 1	5:11 AM	6:05 AM	15	13	80	85
22/07/2005	8486	7.2	Level 5 Pour 1	5:11 AM	6:05 AM	15	13	80	85
22/07/2005	8486	7.2	Level 5 Pour 1	5:11 AM	6:05 AM	15	13	80	85

22/07/2005	8486	7.2	Level 5 Pour 1	5:11 AM	6:05 AM	15	13	80	85
22/07/2005	8486	7.2	Level 5 Pour 1	5:11 AM	6:05 AM	15	13	80	85
22/07/2005	8486	7.2	Level 5 Pour 1	5:11 AM	6:05 AM	15	13	80	85
27/07/2005	8663	5.6	Level 5 Pour 2	data not aquired		21	15	80	90
27/07/2005	8663	5.6	Level 5 Pour 2	from concrete supplier		21	15	80	90
27/07/2005	8663	5.6	Level 5 Pour 2			21	15	80	90
27/07/2005	8663	5.6	Level 5 Pour 2			21	15	80	90
27/07/2005	8663	5.6	Level 5 Pour 2			21	15	80	90
27/07/2005	8663	5.6	Level 5 Pour 2			21	15	80	90
27/07/2005	8663	5.6	Level 5 Pour 2			21	15	80	90
27/07/2005	8668	7.2	Level 5 Pour 2			16	9	80	85
27/07/2005	8668	7.2	Level 5 Pour 2			16	9	80	85
27/07/2005	8668	7.2	Level 5 Pour 2			16	9	80	85
27/07/2005	8664	7.2	Level 5 Pour 2			18	12	80	80
27/07/2005	8664	7.2	Level 5 Pour 2			18	12	80	80
27/07/2005	8664	7.2	Level 5 Pour 2			18	12	80	80
27/07/2005	8691	5.6	Level 5 Pour 2			18	13	80	90
27/07/2005	8691	5.6	Level 5 Pour 2			18	13	80	90
27/07/2005	8691	5.6	Level 5 Pour 2			18	13	80	90
8/5/2005	8668	7.2	Level 6 Pour 1	data not aquired		17	8	80	95
8/5/2005	8663	5.6	Level 6 Pour 1	from concrete supplier		17	8	80	95
8/5/2005	8663	5.6	Level 6 Pour 1			17	8	80	95
8/5/2005	8663	5.6	Level 6 Pour 1			17	8	80	95
8/5/2005	8663	5.6	Level 6 Pour 1			17	8	80	95
8/5/2005	8663	5.6	Level 6 Pour 1			17	8	80	95
8/5/2005	8663	5.6	Level 6 Pour 1			17	8	80	95
8/5/2005	8663	5.6	Level 6 Pour 1			17	8	80	95
8/5/2005	8684	7.2	Level 6 Pour 1			17	8	80	95
8/5/2005	8684	7.2	Level 6 Pour 1			17	8	80	95
8/5/2005	8684	7.2	Level 6 Pour 1			15	10	80	95
8/5/2005	8664	7.2	Level 6 Pour 1			15	10	80	95
8/5/2005	8664	7.2	Level 6 Pour 1			15	10	80	95
8/5/2005	8664	7.2	Level 6 Pour 1			16	7	80	85
8/5/2005	8465	7.2	Level 6 Pour 1			16	7	80	85
8/5/2005	8465	7.2	Level 6 Pour 1			16	7	80	85
8/5/2005	8465	7.2	Level 6 Pour 1			16	8	80	80
8/5/2005	8465	7.2	Level 6 Pour 1			16	8	80	80
8/5/2005	8465	7.2	Level 6 Pour 1			16	8	80	80
8/10/2005	8691	5.6	Level 6 Pour 2	2:33 AM	3:30 AM	15	10	80	90
8/10/2005	8691	5.6	Level 6 Pour 2	2:33 AM	3:30 AM	15	10	80	90
8/10/2005	8691	5.6	Level 6 Pour 2	2:33 AM	3:30 AM	15	10	80	90
8/10/2005	8684	7.2	Level 6 Pour 2	3:35 AM	4:35 AM	15	9	80	90
8/10/2005	8684	7.2	Level 6 Pour 2	3:35 AM	4:35 AM	15	9	80	90
8/10/2005	8684	7.2	Level 6 Pour 2	3:35 AM	4:35 AM	15	9	80	90
8/10/2005	8689	6.8	Level 6 Pour 2	5:23 AM	6:30 AM	15	10	80	95
8/10/2005	8689	6.8	Level 6 Pour 2	5:23 AM	6:30 AM	15	10	80	95
8/10/2005	8689	6.8	Level 6 Pour 2	5:23 AM	6:30 AM	15	10	80	95
8/10/2005	8486	7.2	Level 6 Pour 2	6:17 AM	7:20 AM	15	8	80	95
8/10/2005	8486	7.2	Level 6 Pour 2	6:17 AM	7:20 AM	15	8	80	95
8/10/2005	8486	7.2	Level 6 Pour 2	6:17 AM	7:20 AM	15	8	80	95
8/10/2005	8486	7.2	Level 6 Pour 2	6:17 AM	7:20 AM	15	8	80	95
8/10/2005	8486	7.2	Level 6 Pour 2	6:17 AM	7:20 AM	15	8	80	95
8/10/2005	8486	7.2	Level 6 Pour 2	6:17 AM	7:20 AM	15	8	80	95
8/10/2005	8486	7.2	Level 6 Pour 2	6:17 AM	7:20 AM	15	8	80	95
19/08/2005	8684	7.2	Level 7 Pour 1	3:23 AM	3:45 AM	18	14	80	95
19/08/2005	8684	7.2	Level 7 Pour 1	3:23 AM	3:45 AM	18	14	80	95

19/08/2005	8684	7.2	Level 7 Pour 1	3:23 AM	3:45 AM	18	14	80	95
19/08/2005	8664	7.2	Level 7 Pour 1	4:45 AM	4:45 AM	18	14	80	95
19/08/2005	8664	7.2	Level 7 Pour 1	4:45 AM	4:45 AM	18	14	80	95
19/08/2005	8664	7.2	Level 7 Pour 1	4:45 AM	4:45 AM	18	14	80	95
19/08/2005	8689	7.2	Level 7 Pour 1	4:38 AM	5:50 AM	20	14	80	65
19/08/2005	8689	7.2	Level 7 Pour 1	4:38 AM	5:50 AM	20	14	80	65
19/08/2005	8689	7.2	Level 7 Pour 1	4:38 AM	5:50 AM	20	14	80	65
19/08/2005	8689	7.2	Level 7 Pour 1	6:36 AM	7:00 AM	20	14	80	75
19/08/2005	8689	7.2	Level 7 Pour 1	6:36 AM	7:00 AM	20	14	80	75
19/08/2005	8689	7.2	Level 7 Pour 1	6:36 AM	7:00 AM	20	14	80	75
19/08/2005	8607	5.8	Level 7 Pour 1	7:18 AM	8:00 AM	20	14	80	85
19/08/2005	8607	5.8	Level 7 Pour 1	7:18 AM	8:00 AM	20	14	80	85
19/08/2005	8607	5.8	Level 7 Pour 1	7:18 AM	8:00 AM	20	14	80	85
19/08/2005	8607	5.8	Level 7 Pour 1	7:18 AM	8:00 AM	20	14	80	85
19/08/2005	8607	5.8	Level 7 Pour 1	7:18 AM	8:00 AM	20	14	80	85
19/08/2005	8607	5.8	Level 7 Pour 1	7:18 AM	8:00 AM	20	14	80	85
19/08/2005	8607	5.8	Level 7 Pour 1	7:18 AM	8:00 AM	20	14	80	85
25/08/2005	8689	7.2	Level 7 Pour 2	data not aquired		16	8	80	80
25/08/2005	8689	7.2	Level 7 Pour 2	from concrete supplier		16	8	80	80
25/08/2005	8689	7.2	Level 7 Pour 2			16	8	80	80
25/08/2005	8664	7.2	Level 7 Pour 2			16	7	80	90
25/08/2005	8664	7.2	Level 7 Pour 2			16	7	80	90
25/08/2005	8664	7.2	Level 7 Pour 2			16	7	80	90
25/08/2005	8647	7.2	Level 7 Pour 2			18	11	80	85
25/08/2005	8647	7.2	Level 7 Pour 2			18	11	80	85
25/08/2005	8647	7.2	Level 7 Pour 2			18	11	80	85
25/08/2005	8647	7.2	Level 7 Pour 2			19	12	80	90
25/08/2005	8647	7.2	Level 7 Pour 2			19	12	80	90
25/08/2005	8647	7.2	Level 7 Pour 2			19	12	80	90
25/08/2005	8647	7.2	Level 7 Pour 2			19	12	80	90
25/08/2005	8647	7.2	Level 7 Pour 2			19	12	80	90
25/08/2005	8647	7.2	Level 7 Pour 2			19	12	80	90
25/08/2005	8647	7.2	Level 7 Pour 2			19	12	80	90

APPENDIX E

Concrete Compressive Strength (f_c) Results from the Experimental Analysis.

First Floor
SOUTH Slab

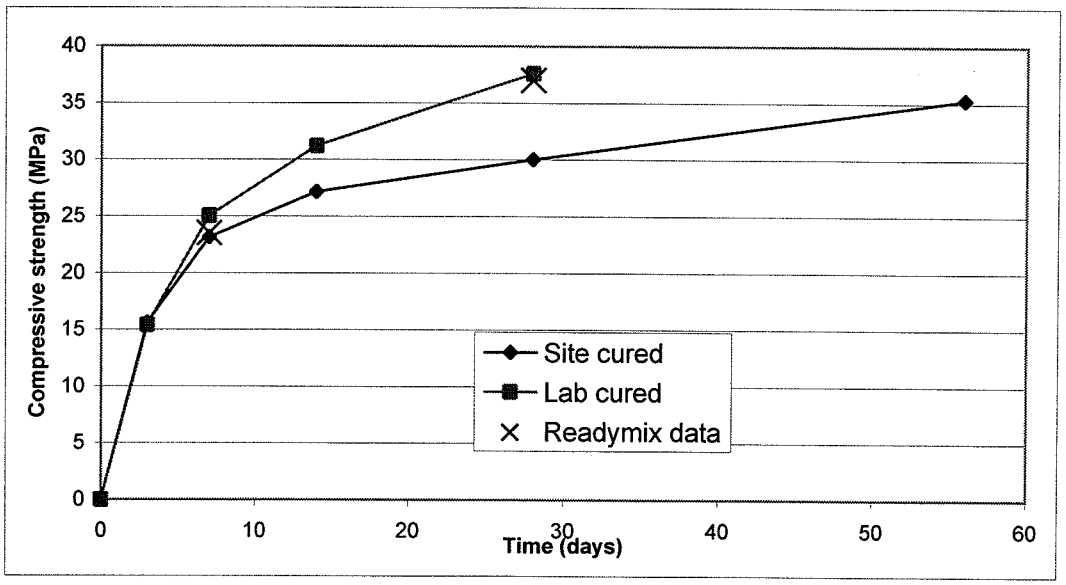
Strength records

SITE CURED

	Compressive strength (MPa)			
Day	# 1	# 2	# 3	**Average**
3	15.9	16.9	14	**15.6**
7	22.97	23.04	23.34	**23.1**
14	27.57	27.78	26.09	**27.14667**
28	29.43	30.57	-	**30**
56	35.66	34.89	-	**35.275**

LAB CURED

	Compressive strength (MPa)			
Day	# 1	# 2	# 3	**Average**
3	16.8	14	-	**15.4**
7	24.53	25.54	-	**25.035**
14	30.05	31.13	32.4	**31.19333**
28	38.46	38.73	35.57	**37.58667**



First Floor
NORTH Slab

Strength of 1 day samples

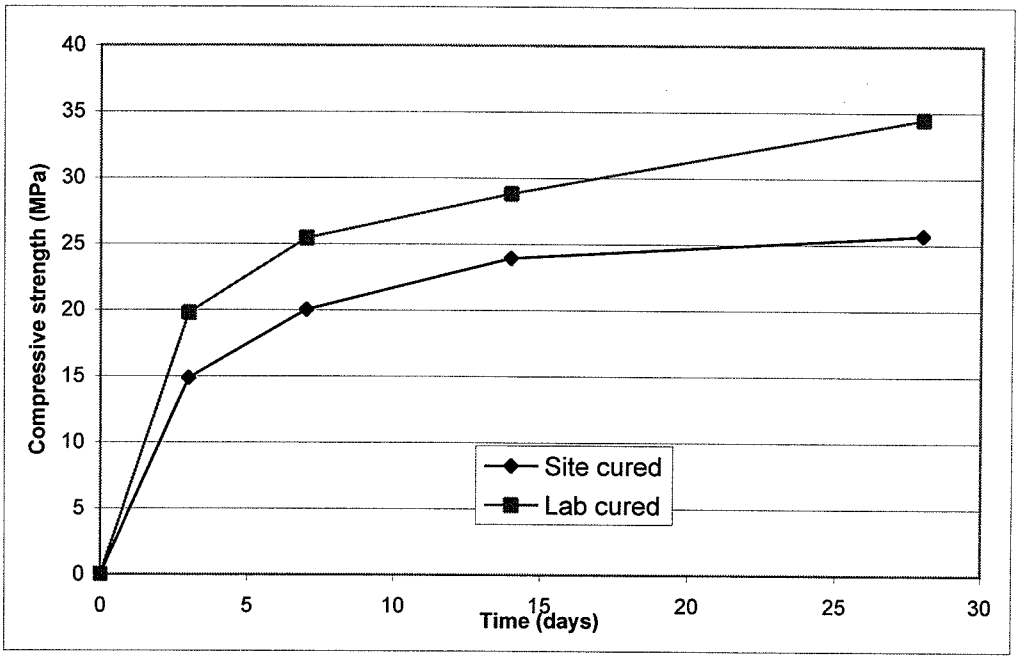
	6.4 MPa
	9.2 MPa
Average	7.8 MPa

SITE CURED

	Compressive strength (MPa)			
Day	# 1	# 2	# 3	**Average**
3	13.57	14.2	16.78	**14.85**
7	19.2	20.5	20.37	**20.02333**
14	25.36	22.47	23.97	**23.93333**
28	26.5	25.46	25.06	**25.67333**

LAB CURED

	Compressive strength (MPa)			
Day	# 1	# 2	# 3	**Average**
3	20.92	20.32	18.1	**19.78**
7	24.02	26.11	26.17	**25.43333**
14	30.6	29.14	26.71	**28.81667**
28	34.99	30.85	37.54	**34.46**



Second Floor
SOUTH Slab

Strength of 1 day samples

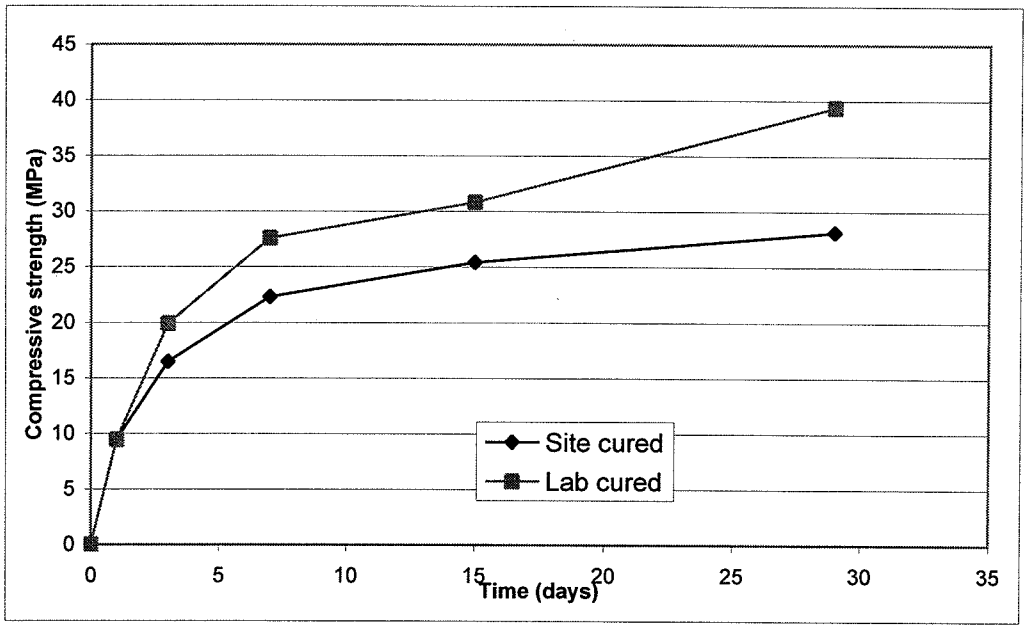
	8.99 MPa
	9.88 MPa
Average	9.435 MPa

SITE CURED

	Compressive strength (MPa)			
Day	# 1	# 2	# 3	**Average**
3	16.73	16.26	16.37	**16.45**
7	22.59	22.01		**22.3**
15	26	24.86		**25.43**
29	27.59	28.67		**28.13**

LAB CURED

	Compressive strength (MPa)			
Day	# 1	# 2	# 3	**Average**
3	20.57	19.48	19.61	**19.89**
7	27.02	28.14	26.14	**27.58**
15	31.19	31.18	30.07	**30.81**
29	38.75	39.78	39.56	**39.36**



Second Floor
NORTH Slab

Strength of 1 day samples

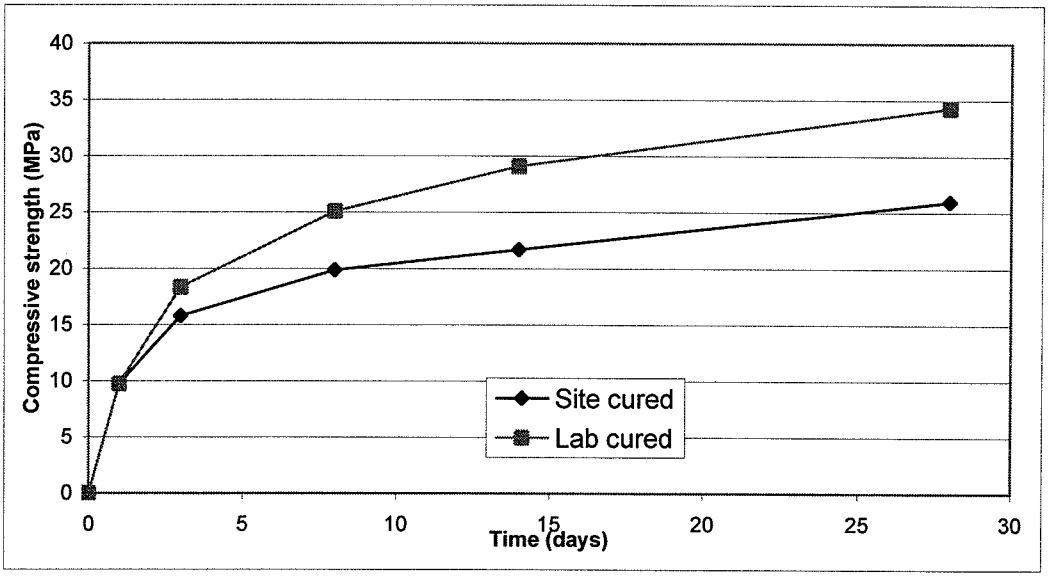
	9.32 MPa
	10.16 MPa
Average	9.74 MPa

SITE CURED

	Compressive strength (MPa)			
Day	# 1	# 2	# 3	**Average**
3	15.58	15.83	15.9	**15.77**
8	18.96	20.7	19.83	**19.8**
14	21.24	22.45	21.32	**21.67**
28	23.68	28.24	-	**25.96**

LAB CURED

	Compressive strength (MPa)			
Day	# 1	# 2	# 3	**Average**
3	18.38	17.75	18.83	**18.32**
8	24.71	25.44	23.77	**25.075**
14	29.51	28.07	29.71	**29.09667**
28	34.75	33.83		**34.29**



Third Floor
SOUTH Slab

Strength of 1 day samples

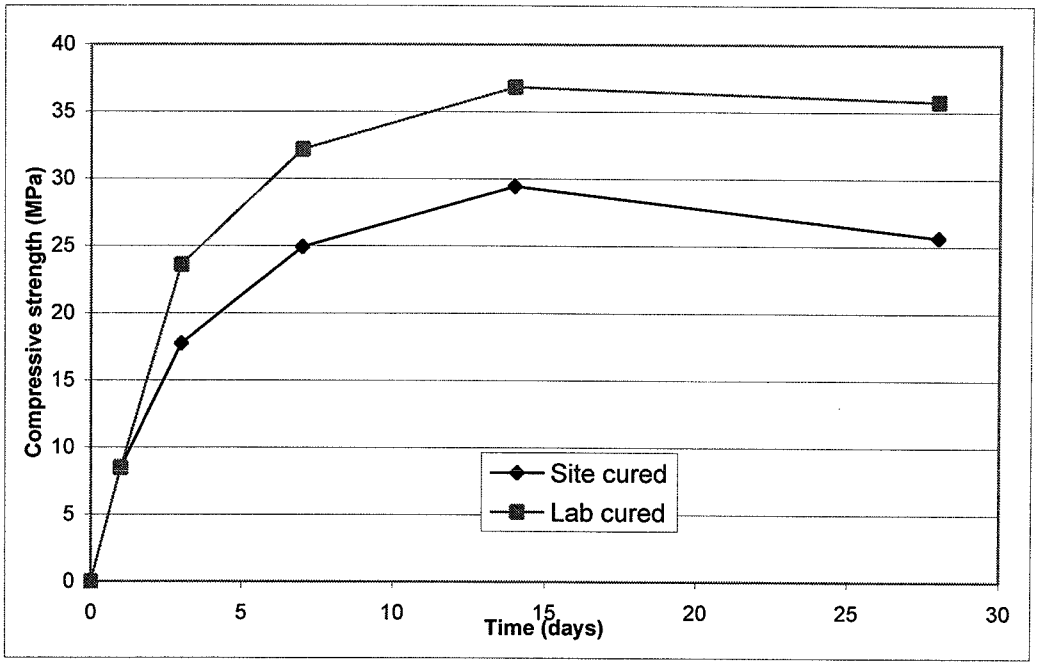
	8.29 MPa
	8.7 MPa
Average	8.495 MPa

SITE CURED

	Compressive strength (MPa)			
Day	# 1	# 2	# 3	**Average**
3	17.92	16.79	18.42	**17.71**
7	26	23.12	25.61	**24.9**
14	29.47	29.41	-	**29.44**
28	28.15	23.09		**25.62**

LAB CURED

	Compressive strength (MPa)			
Day	# 1	# 2	# 3	**Average**
3	24.36	22.23	24.19	**23.59333**
7	32.4	31.95	33.06	**32.175**
14	35.75	37.87	-	**36.81**
28	34.01	37.54		**35.775**



Third Floor
NORTH Slab

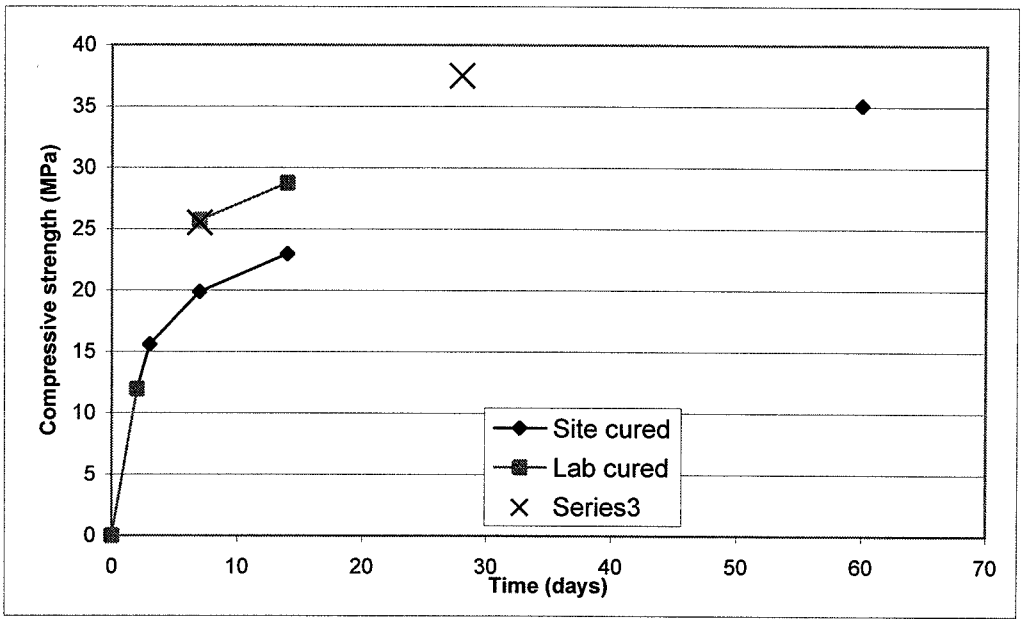
Strength of 2 day samples	11.95	MPa
	-	MPa
Average	11.95	MPa

SITE CURED

	Compressive strength (MPa)			
Day	# 1	# 2	# 3	**Average**
3	15.57			**15.57**
7	19.78	19.97	-	**19.9**
14	24.02	21.9		**22.96**
28				
60	35.09			**35.09**

LAB CURED

	Compressive strength (MPa)			
Day	# 1	# 2	# 3	**Average**
	N/A	N/A	N/A	**#DIV/0!**
7	23.59	27.81	-	**25.7**
14	28.34	29.17		**28.755**
28				
60				



Fourth Floor
SOUTH Slab

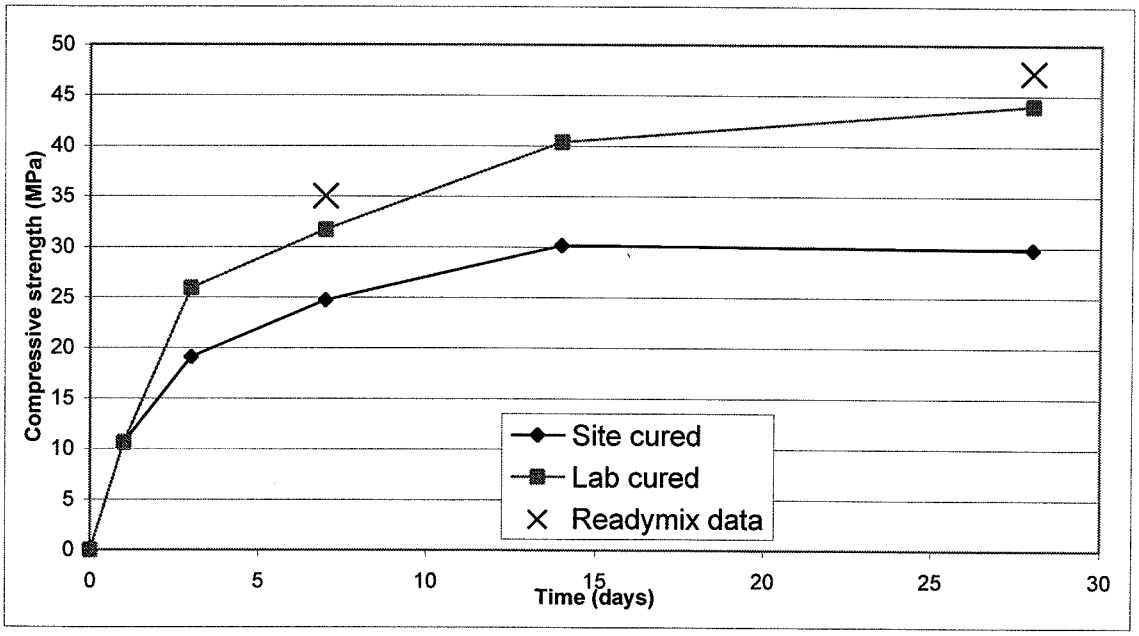
Strength of 1 day samples		10.77 MPa
		10.51 MPa
	Average	10.64 MPa

SITE CURED

	Compressive strength (MPa)			
Day	# 1	# 2	# 3	**Average**
3	18.02	20.18		**19.1**
7	26.53	22.9		**24.715**
14	29.19	31.09		**30.14**
28	32.08	27.44		**29.76**

LAB CURED

	Compressive strength (MPa)			
Day	# 1	# 2	# 3	**Average**
3	25.34	26.49		**25.915**
7	35.8	27.58		**31.69**
14	40.26	40.49		**40.375**
28	42.67	45.35		**44.01**



Fourth Floor
NORTH Slab

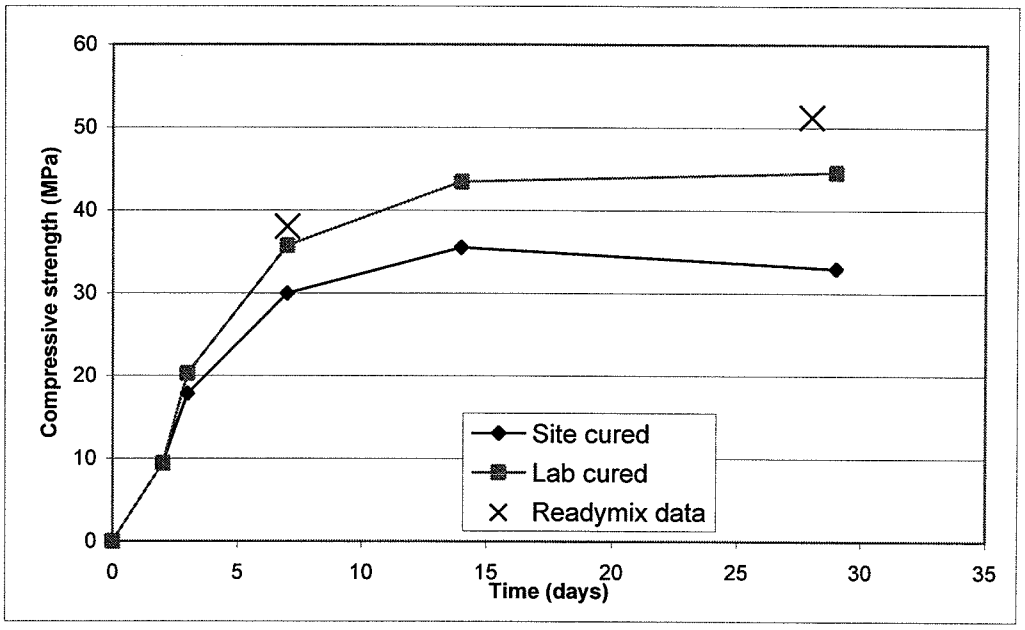
Strength of 2 day samples	10.15	MPa
	8.67	MPa
Average	9.41	MPa

SITE CURED

	Compressive strength (MPa)			
Day	# 1	# 2	# 3	**Average**
3	17.12	18.59		**17.855**
7	29.82	30.1		**30.0**
14	34.67	36.3		**35.485**
29	34.41	32.98	31.35	**32.91333**

LAB CURED

	Compressive strength (MPa)			
Day	# 1	# 2	# 3	**Average**
3	18.97	21.57		**20.27**
7	37.51	33.92		**35.715**
14	43.61	43.23		**43.42**
29	49.22	39.14	45.31	**44.55667**



Fifth Floor
SOUTH Slab

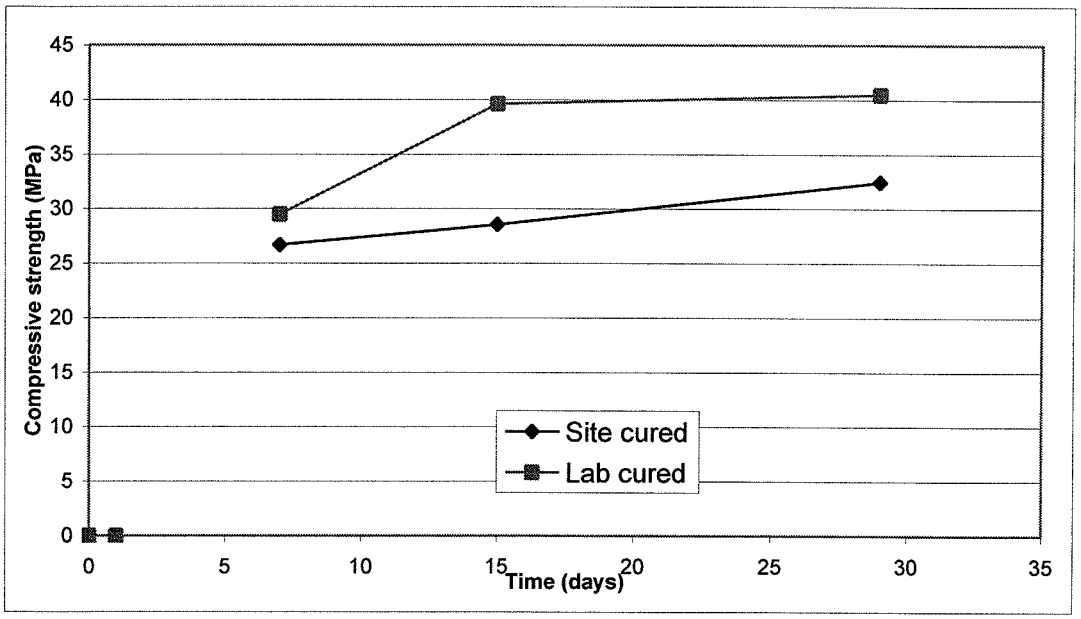
SITE CURED

	Compressive strength (MPa)			
Day	# 1	# 2	# 3	**Average**
3				
7	26.69	26.67		**26.68**
15	27.67	29.4		**28.535**
29	32.57	30.55		**31.56**

LAB CURED

	Compressive strength (MPa)			
Day	# 1	# 2	# 3	**Average**
3				
7	30.43	28.52		**29.475**
15	29.62	39.62		**39.62**
29	40.25	40.66		**40.455**

recorded but not included due to bad shear failure and compress stress value is significantly less than the next cylinder tested.



Sixth Floor
NORTH Slab

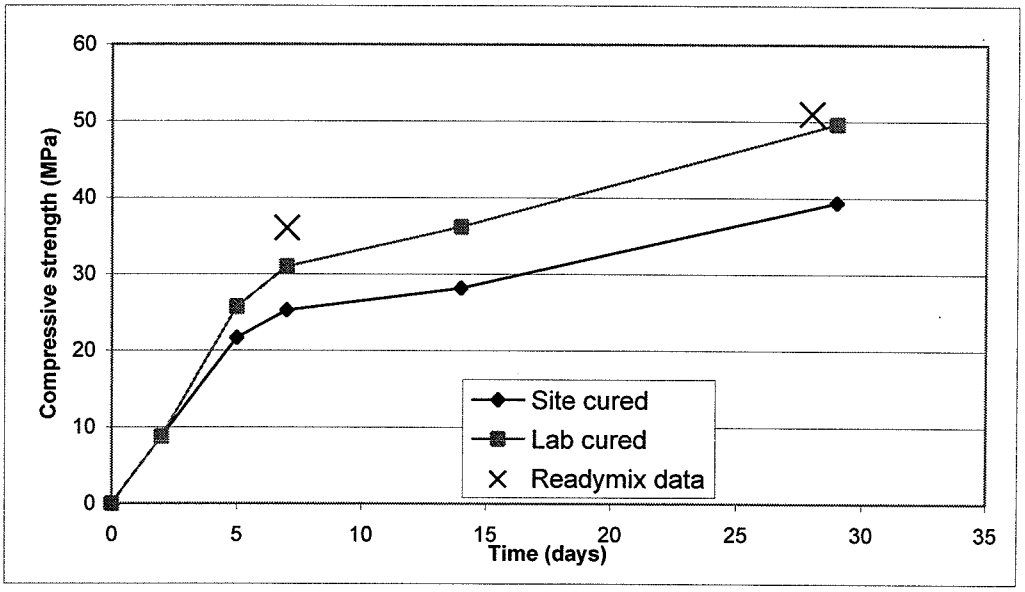
Strength of 2 day samples	8.49	MPa
	9.08	MPa
Average	8.785	MPa

SITE CURED

	Compressive strength (MPa)			
Day	# 1	# 2	# 3	**Average**
5	21.22	22.12		**21.67**
7	24.66	25.82		**25.2**
14	24.22	32.12		**28.17**
29	39.08	39.65		**39.365**

LAB CURED

	Compressive strength (MPa)			
Day	# 1	# 2	# 3	**Average**
5	25.56	25.84		**25.7**
7	27.04	34.92		**30.98**
14	34.66	37.71		**36.185**
29	47.97	51.31		**49.64**



Seventh Floor
SOUTH Slab

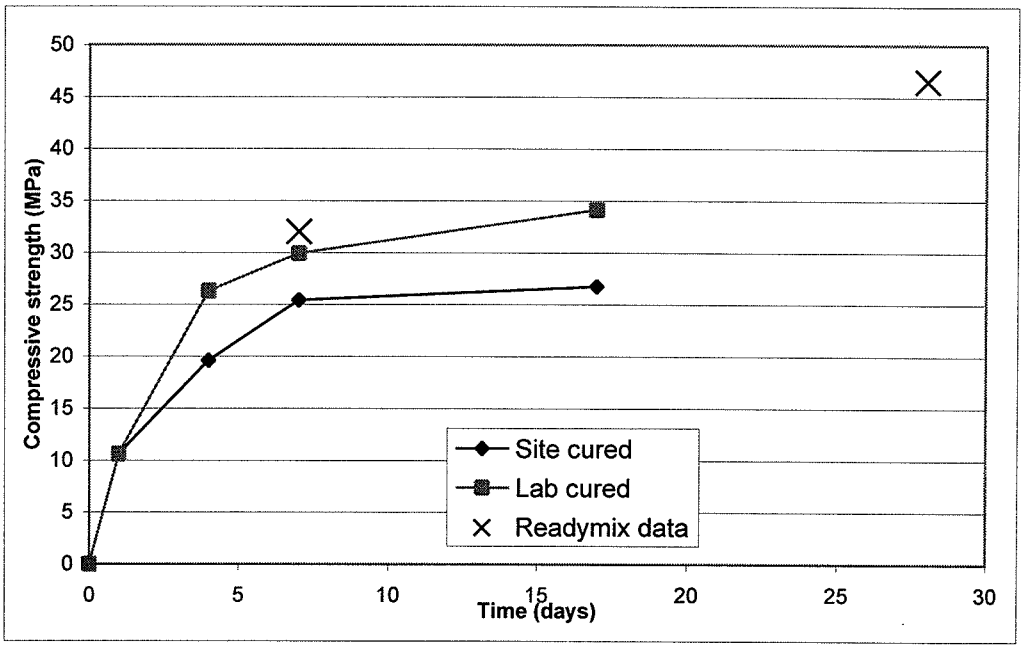
Strength of 1 day samples		10.37 MPa
		10.85 MPa
	Average	10.61 MPa

SITE CURED

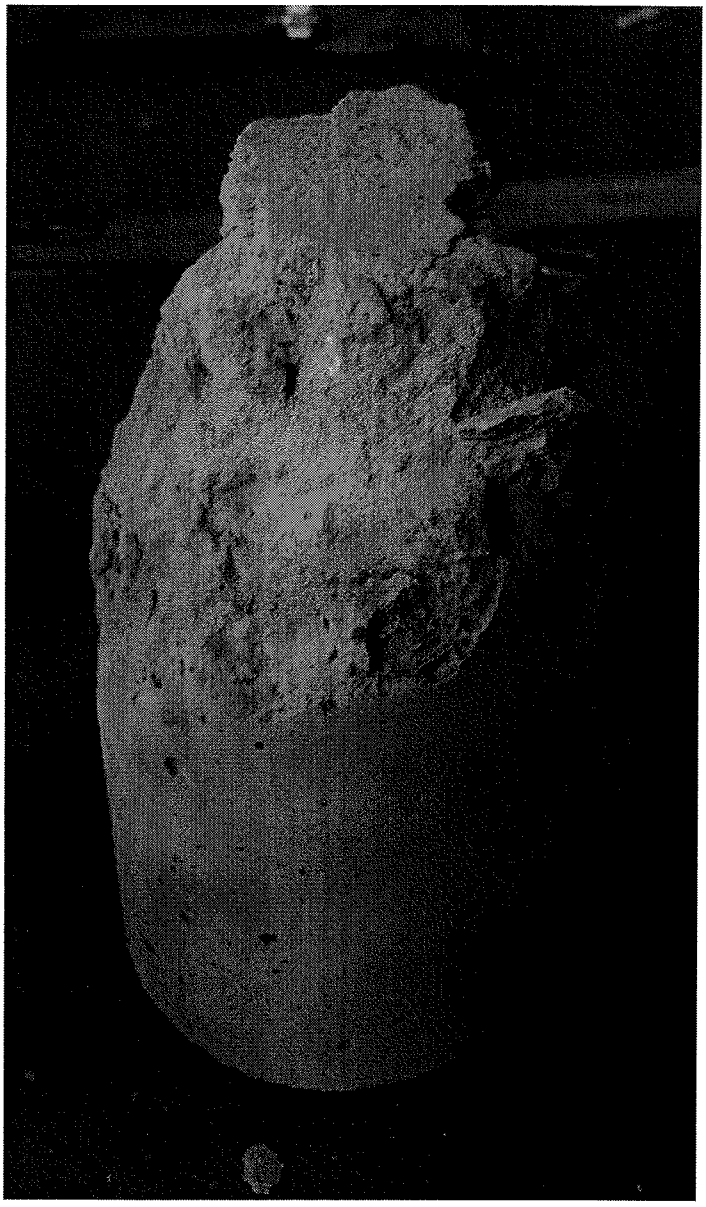
	Compressive strength (MPa)			
Day	# 1	# 2	# 3	**Average**
4	20.53	18.69		**19.61**
7	25.46	25.36		**25.41**
17	27.65	25.87		**26.76**
28				

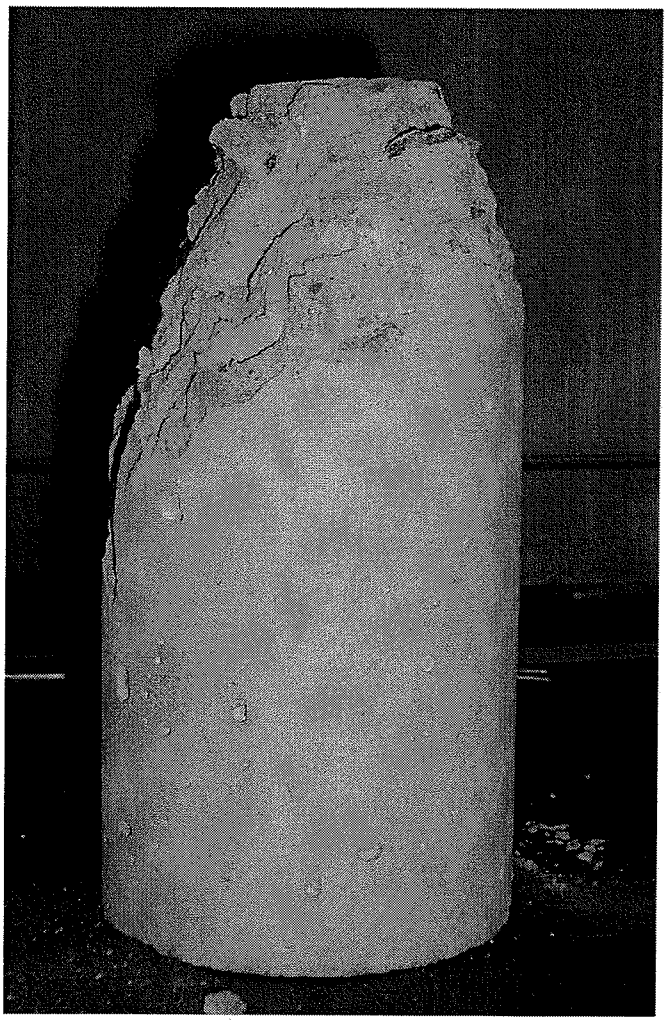
LAB CURED

	Compressive strength (MPa)			
Day	# 1	# 2	# 3	**Average**
4	25.34	27.28		**26.31**
7	30.27	29.6		**29.935**
17	34.85	33.43		**34.14**
28				



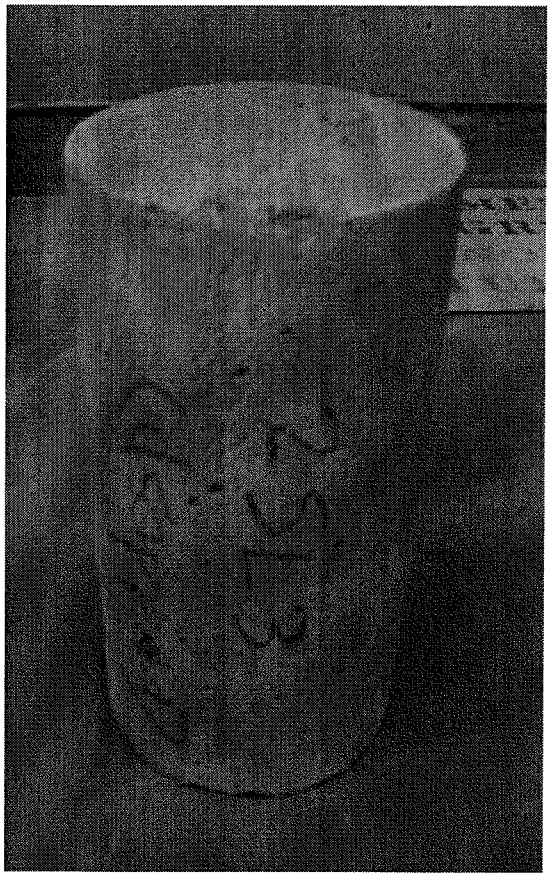
The following figures are detailed photos taken of the premature failure that was occurring when testing for compressive strength with the rubber caps at early ages.



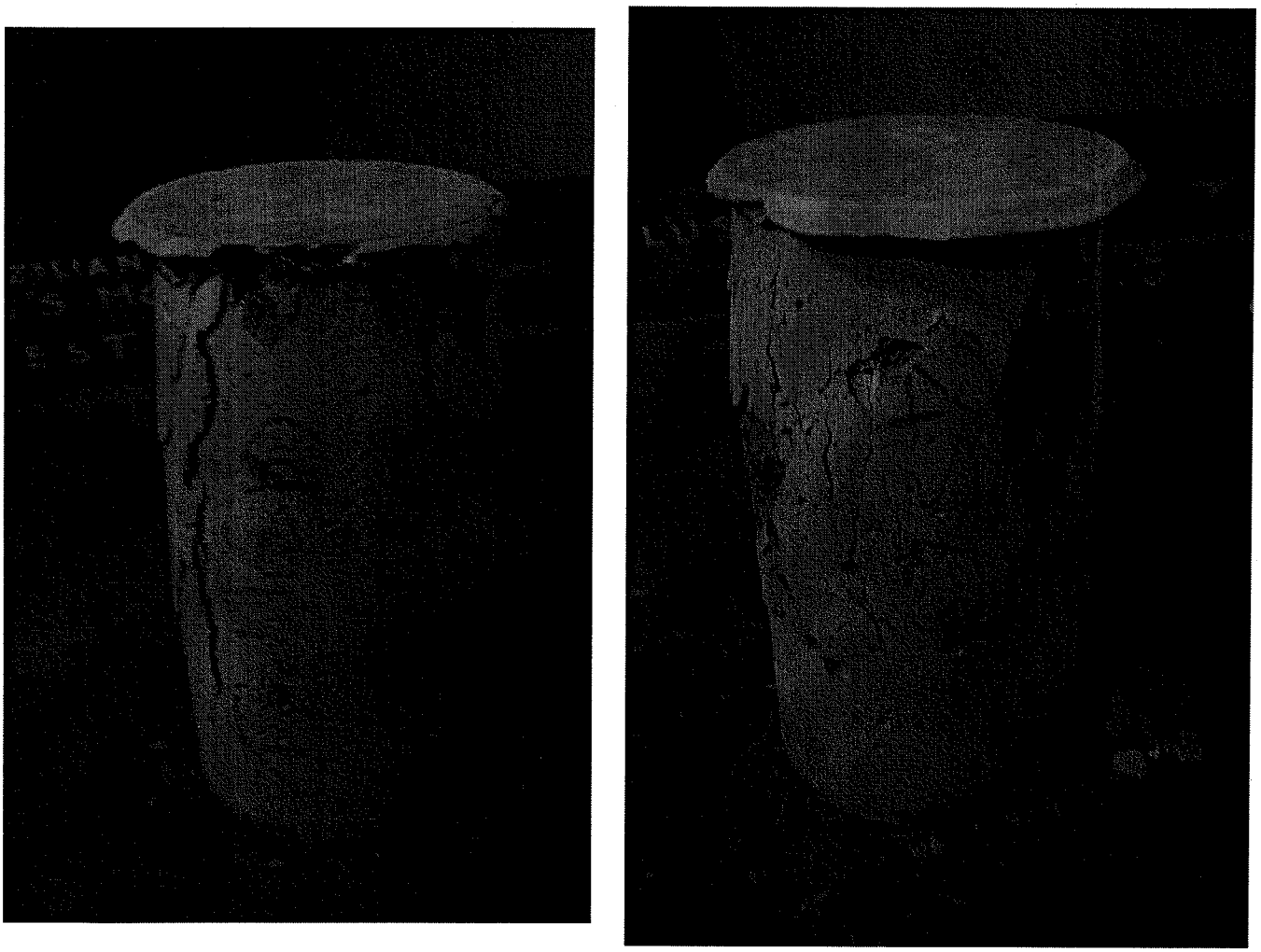



TEST

The next set of figures show detail about the cylinder labelled as "2SL3". Which is sampled from the 2nd floor, south side slab pour and is the 3rd cylinder which is laboratory cured. This cylinder was dropped from the preparation table. The only damage to the cylinder is to the top corner, which is shown in the pictures. Due to the clean failure, displayed, the recorded compressive stress was included in the experimental data set.



Damage can be seen at the leading top edge.



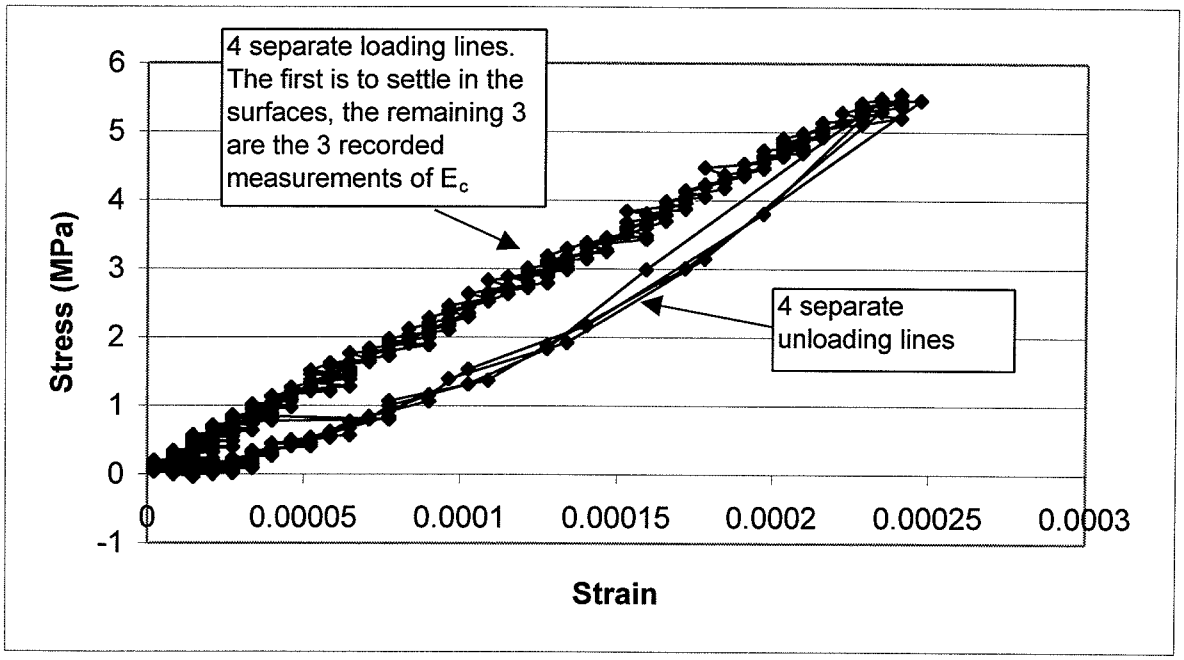
Crack propagation at failure, shown on the front and back of the test cylinder.

APPENDIX F

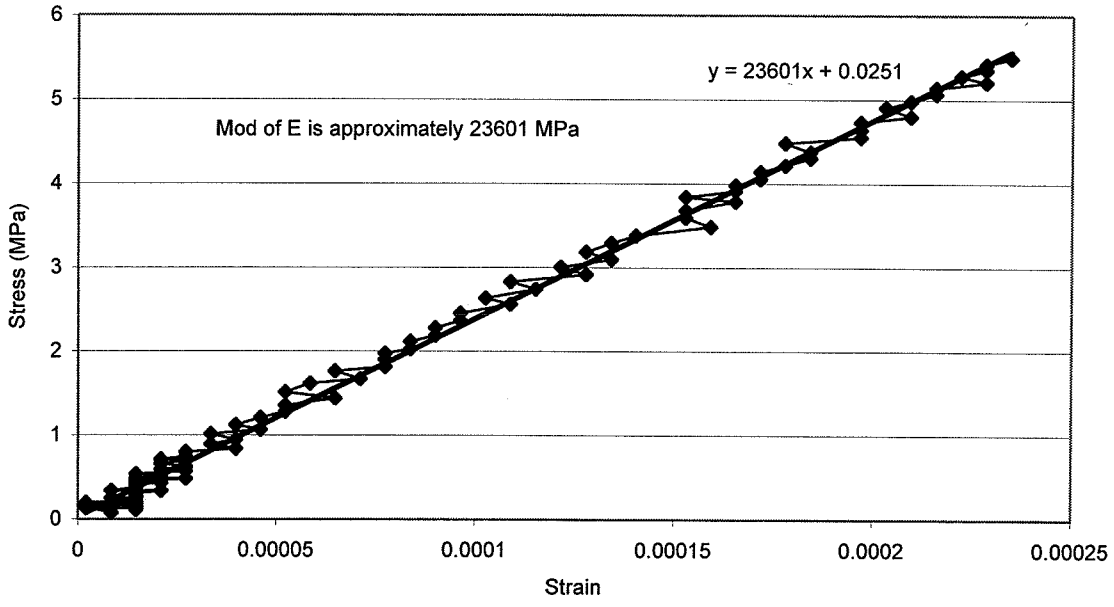
Concrete Modulus of Elasticity (E_c) Results from the Experimental Analysis.

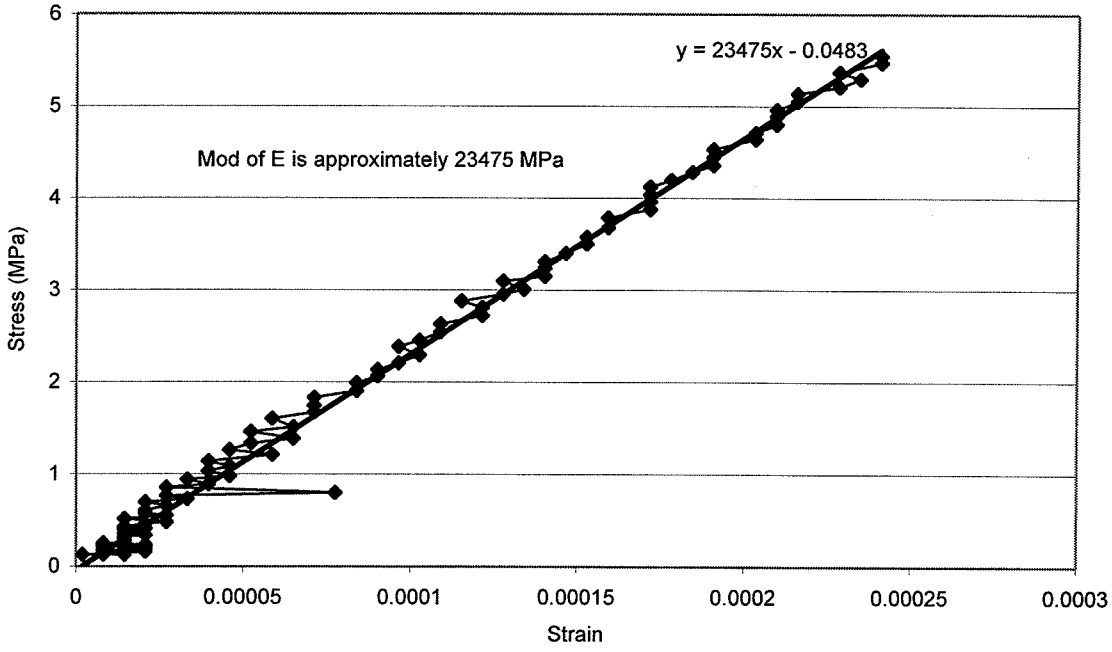
The following data is an example of how the value of Ec was determined for the test cylinders taken from 151 Pirie.

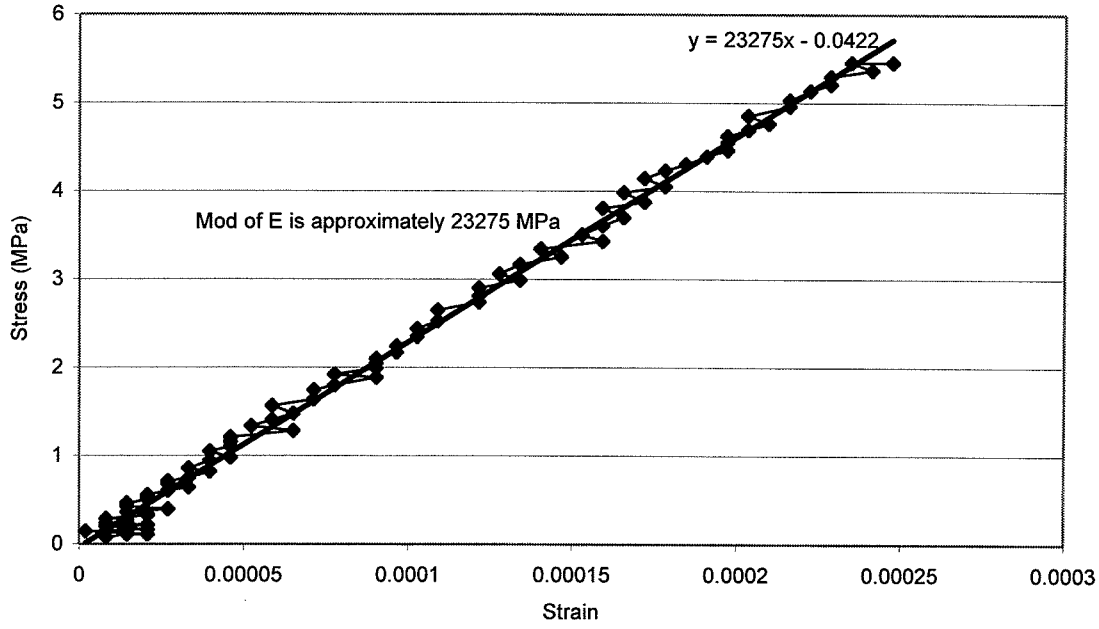
DATA SET
1st floor slab
North Pour
Day 3
Site cured



The three separate loading lines are then analysed seperately.
A trendline is applied to the three separate loading lines.
The following three graphs are an example of this -







The average value of Ec is then determined from an average of the three separate loadings.

Mod of E values		
1	23601	MPa
2	23475	MPa
3	23275	MPa
Average	**23450.33**	**MPa**

Electronic copies of each Ec test have been recorded and are available in the Experimental Data folder.

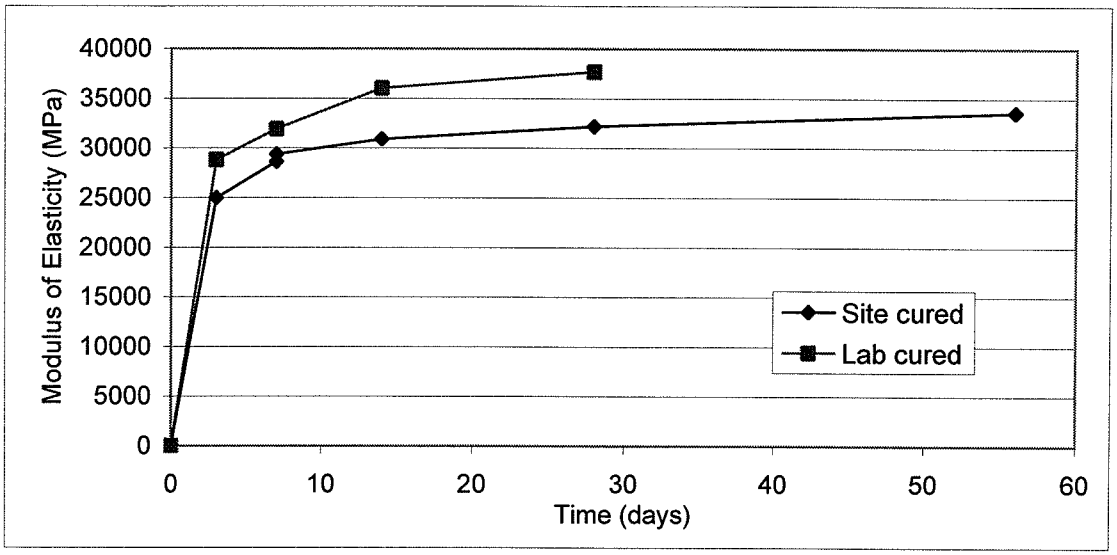
1st Floor Slab, South Pour

SITE CURED

	Modulus of Elasticity (MPa)			
Day	# 1	# 2	# 3	**Average**
3	24782	24987	25154	**24974.33**
7	28982	28250	28657	**28629.67**
7	29605	29371	29107	**29361**
14	31086	30526	31056	**30889.33**
28	32381	32001	32101	**32161**
56	33563	33352	33827	**33580.67**

LAB CURED

	Modulus of Elasticity (MPa)			
Day	# 1	# 2	# 3	**Average**
3	28731	28758	28969	**28819.33**
7	31732	31663	32389	**31928**
14	36519	36059	35534	**36037.33**
28	37503	37723	37827	**37684.33**



1st Floor Slab, North Pour

1day sample		19486 MPa
		19896 MPa
		20426 MPa
	Average	19936 MPa

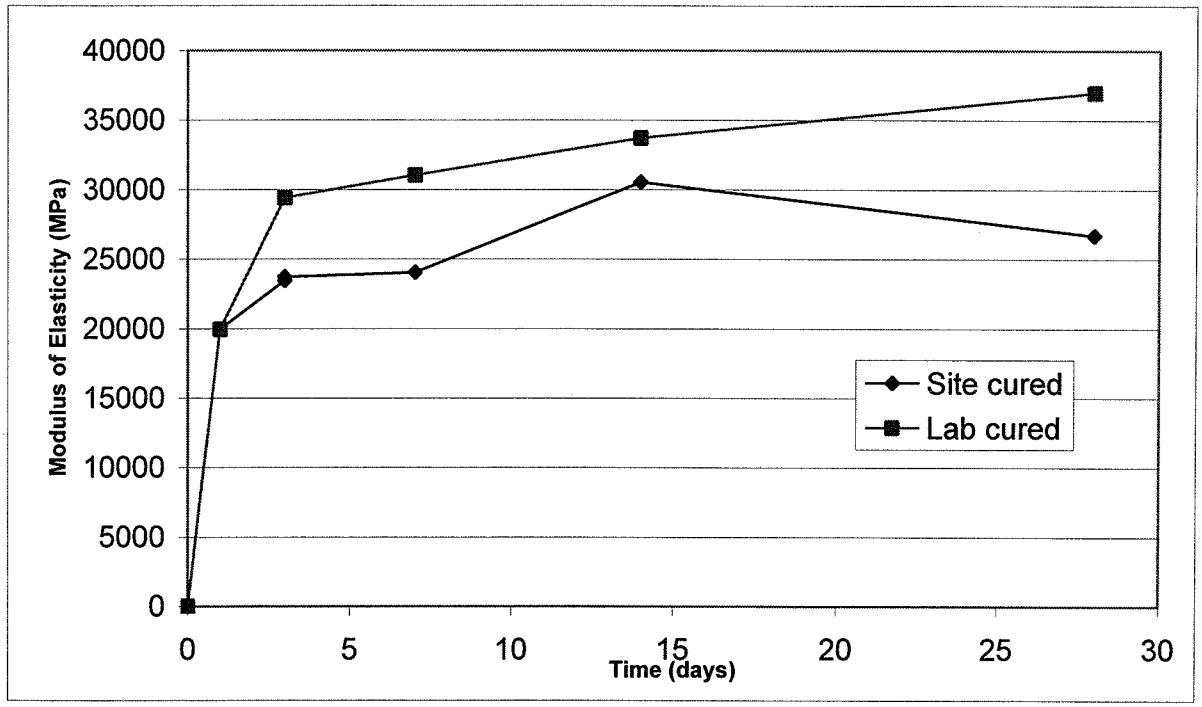
SITE CURED

	Modulus of Elasticity (MPa)			
Day	# 1	# 2	# 3	**Average**
3	23601	23475	23275	**23450.33**
3	23375	23480	24290	**23715**
7	23721	24110	24291	**24040.67**
14	30624	30825	30145	**30531.33**
28	26588	26489	27024	**26700.33**

Potential inaccuracy

LAB CURED

	Modulus of Elasticity (MPa)			
Day	# 1	# 2	# 3	**Average**
3	29232	29336	29704	**29424**
7	31399	30935	30765	**31033**
14	33839	33840	33462	**33713.67**
28	36788	36997	37164	**36983**



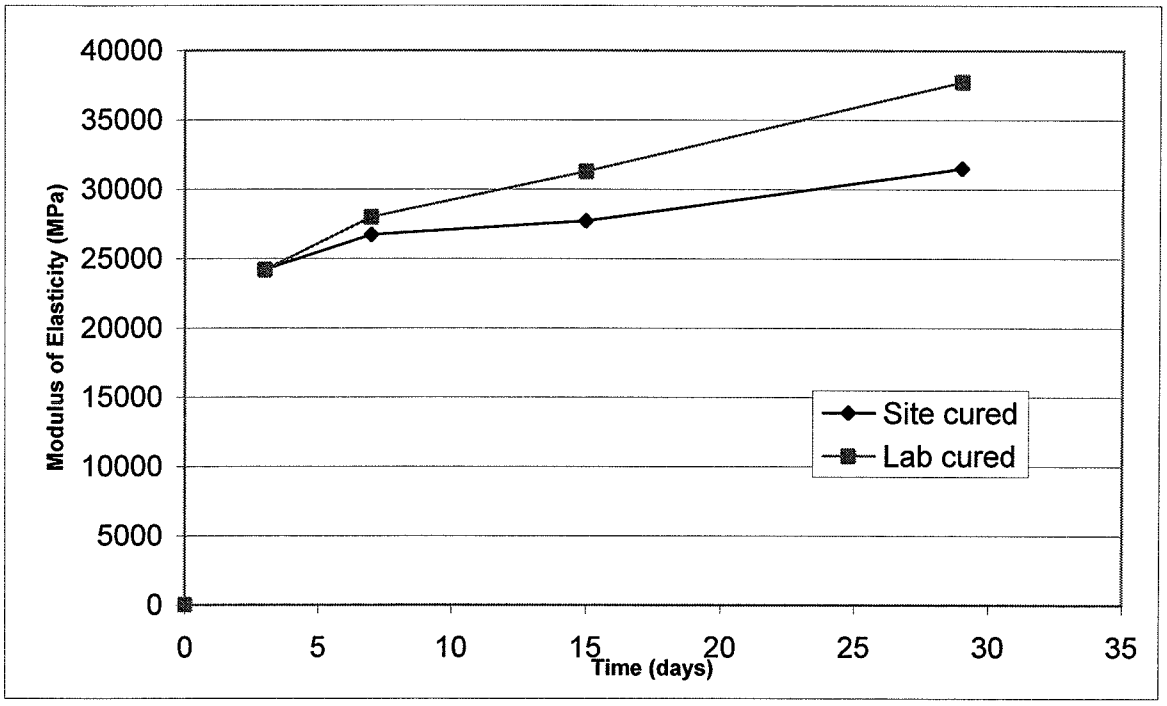
2nd Floor Slab, South Pour

SITE CURED

	Modulus of Elasticity (MPa)			
Day	# 1	# 2	# 3	**Average**
3	24179	24489	23915	**24194.33**
7	26874	26731	26478	**26694.33**
15	27533	27856		**27694.5**
29	31546	31498	31375	**31473**

LAB CURED

	Modulus of Elasticity (MPa)			
Day	# 1	# 2	# 3	**Average**
3	24318	24219	24018	**24185**
7	28038	27847	28087	**27990.67**
15	31178	31346		**31262**
29	36861	38141	38164	**37722**



2nd Floor Slab, North Pour

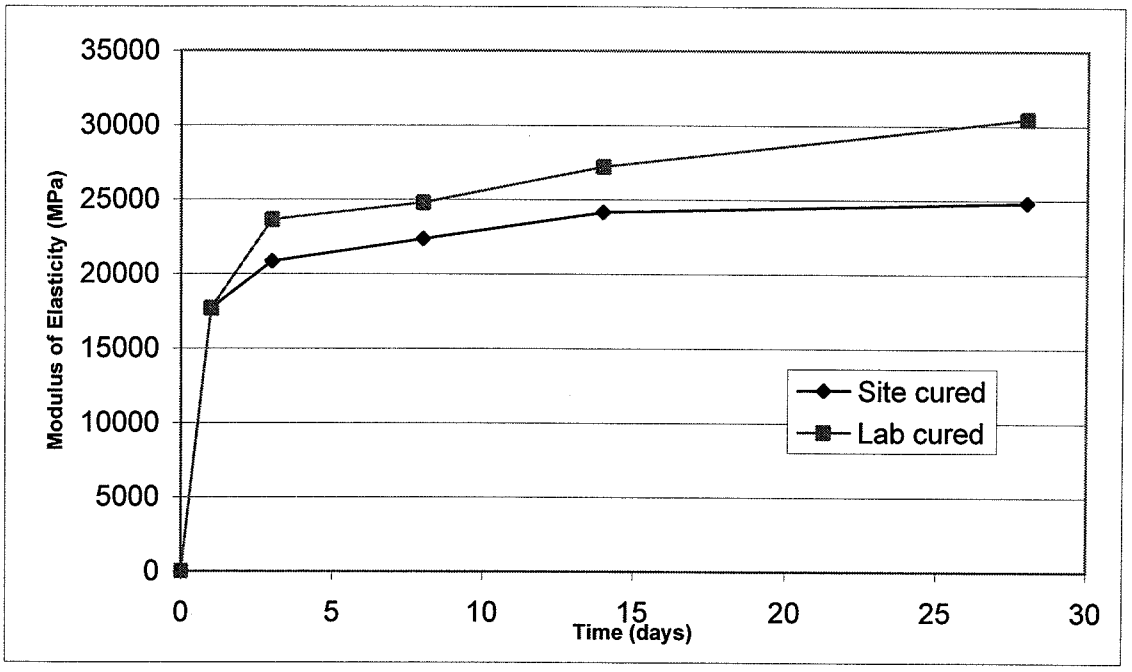
1day sample		18414 MPa
		17410 MPa
		17267 MPa
	Average	17697 MPa

SITE CURED

	Modulus of Elasticity (MPa)			
Day	# 1	# 2	# 3	**Average**
3	21017	20432	21092	**20847**
8	22506	22447	22119	**22357.33**
14	24046	24154	24249	**24149.67**
28	25067	24822	24546	**24811.67**

LAB CURED

	Modulus of Elasticity (MPa)			
Day	# 1	# 2	# 3	**Average**
3	24122	23569	23274	**23655**
8	24596	24693	25075	**24788**
14	27145	27228	27264	**27212.33**
28	30376	30525	30434	**30445**



3rd Floor Slab, South Pour

1day sample	19756	MPa
	19803	MPa
	19496	MPa
Average	19685	MPa

SITE CURED

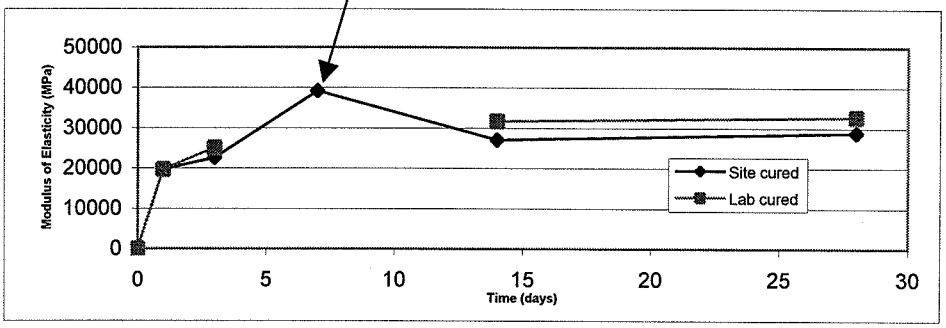
	Modulus of Elasticity (MPa)			
Day	# 1	# 2	# 3	**Average**
3	22160	22887	22731	**22592.67**
7	40051	39069	38405	**39175**
14	27259	27136	26680	**27025**
28	28809	28920	28639	**28789.33**

LAB CURED

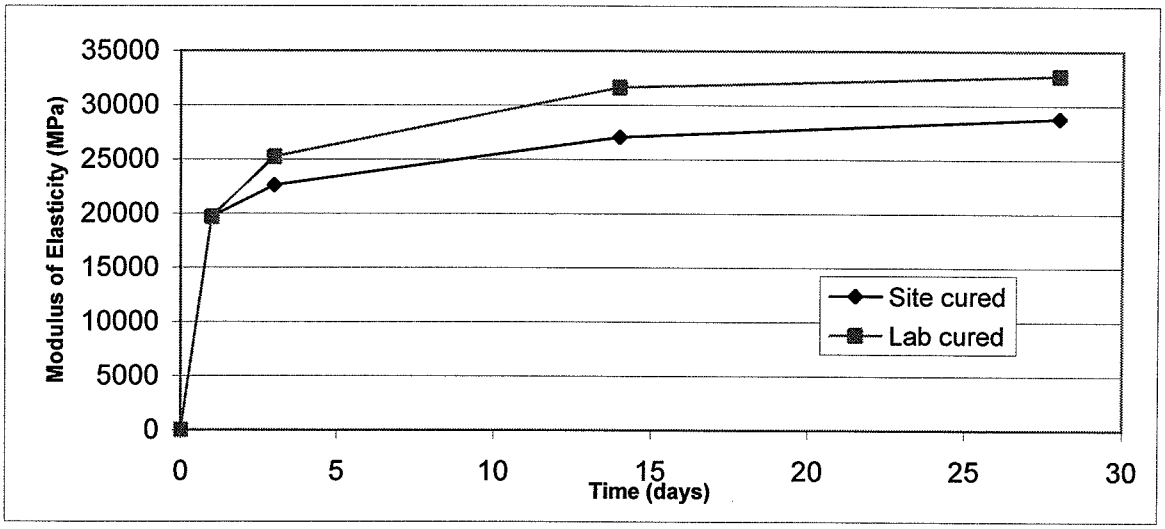
	Modulus of Elasticity (MPa)			
Day	# 1	# 2	# 3	**Average**
3	24827	25170	25218	**25071.67**
7				
14	31568	31617	31721	**31635.33**
28	32575	32555	33030	**32720**

THIS POINT IS REMOVED
ASSUMED EXPERIMENTAL ERROR

INITIAL GRAPH



ADJUSTED GRAPH



3rd Floor Slab, North Pour

2 day sample		23942 MPa
		23714 MPa
		24188 MPa
	Average	23948 MPa

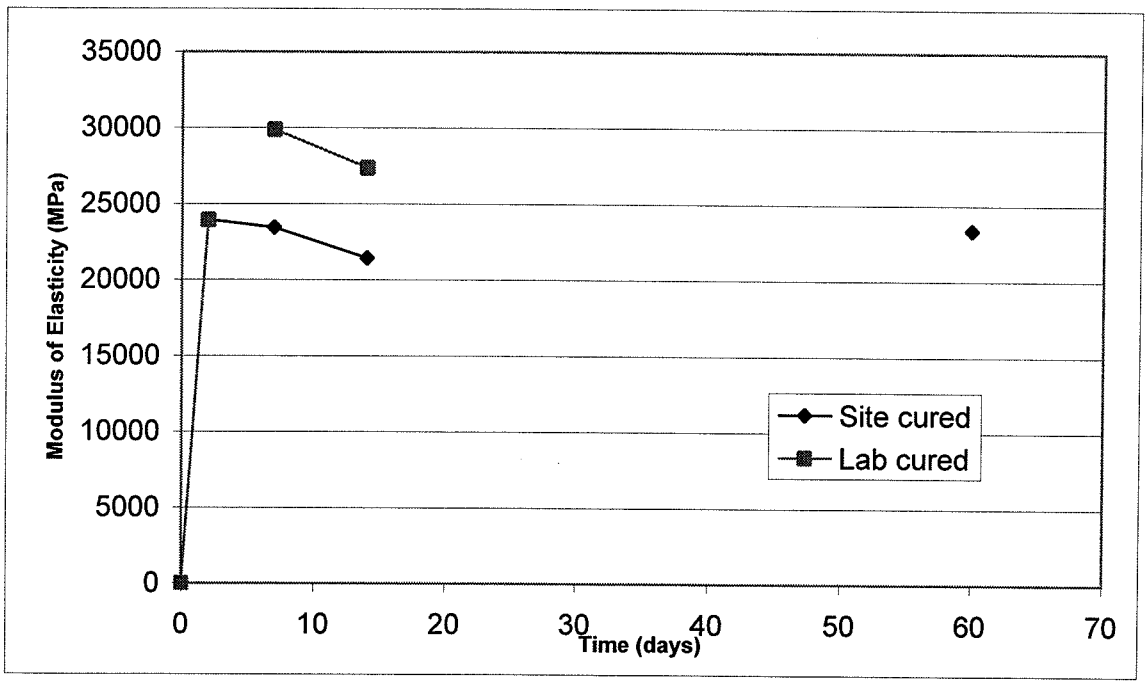
SITE CURED

Day	Modulus of Elasticity (MPa) # 1	# 2	# 3	Average
	N/A	N/A	N/A	**#DIV/0!**
7	23609	24288	22408	**23435**
14	21450	21465	21341	**21418.67**
60	23381	23453	23190	**23341.33**

This data may need to be ignored as the cylider that was tested failed prematurely (possibly damaged on site)

LAB CURED

Day	Modulus of Elasticity (MPa) # 1	# 2	# 3	Average
7	30264	29367	30001	**29877.33**
14	27540	27315	27266	**27373.67**



4th Floor Slab, South Pour

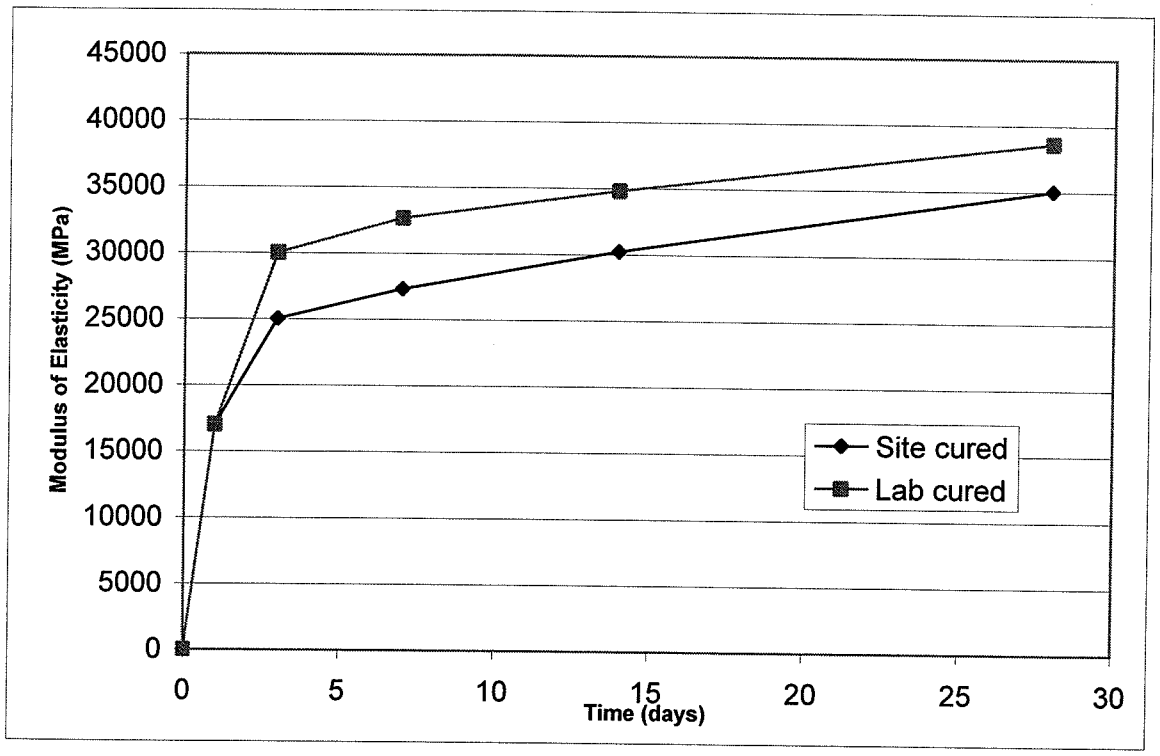
1day sample	16801	MPa
	17062	MPa
	17214	MPa
Average	17025.67	MPa

SITE CURED

	Modulus of Elasticity (MPa)			
Day	# 1	# 2	# 3	**Average**
3	24807	25048	25186	**25013.67**
7	27392	27327	27185	**27301.33**
14	30196	30297	30196	**30229.67**
28	35095	35034	34985	**35038**

LAB CURED

	Modulus of Elasticity (MPa)			
Day	# 1	# 2	# 3	**Average**
3	30165	30353	29522	**30013.33**
7	32517	32701	32732	**32650**
14	34588	34841	35028	**34819**
28	38551	38710	38616	**38625.67**



4th Floor Slab, North Pour

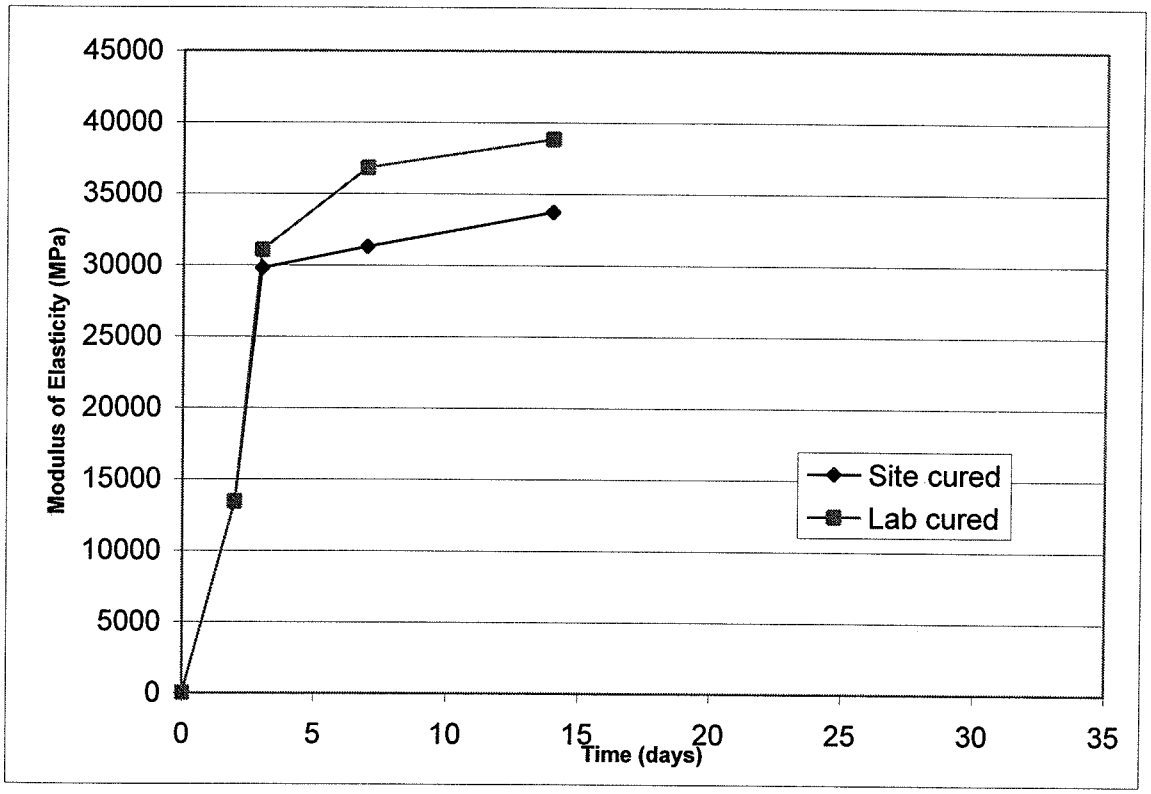
1day sample	13506	MPa
	13436	MPa
	13364	MPa
Average	13435.33	MPa

SITE CURED

	Modulus of Elasticity (MPa)			
Day	# 1	# 2	# 3	**Average**
3	29834	30024	29526	**29794.67**
7	31128	31460	31317	**31301.67**
14	33529	33726	33934	**33729.67**
29				

LAB CURED

	Modulus of Elasticity (MPa)			
Day	# 1	# 2	# 3	**Average**
3	31049	31114	31086	**31083**
7	36779	36967	36781	**36842.33**
14	38852	38947	38694	**38831**
29				



5th Floor Slab, South Pour

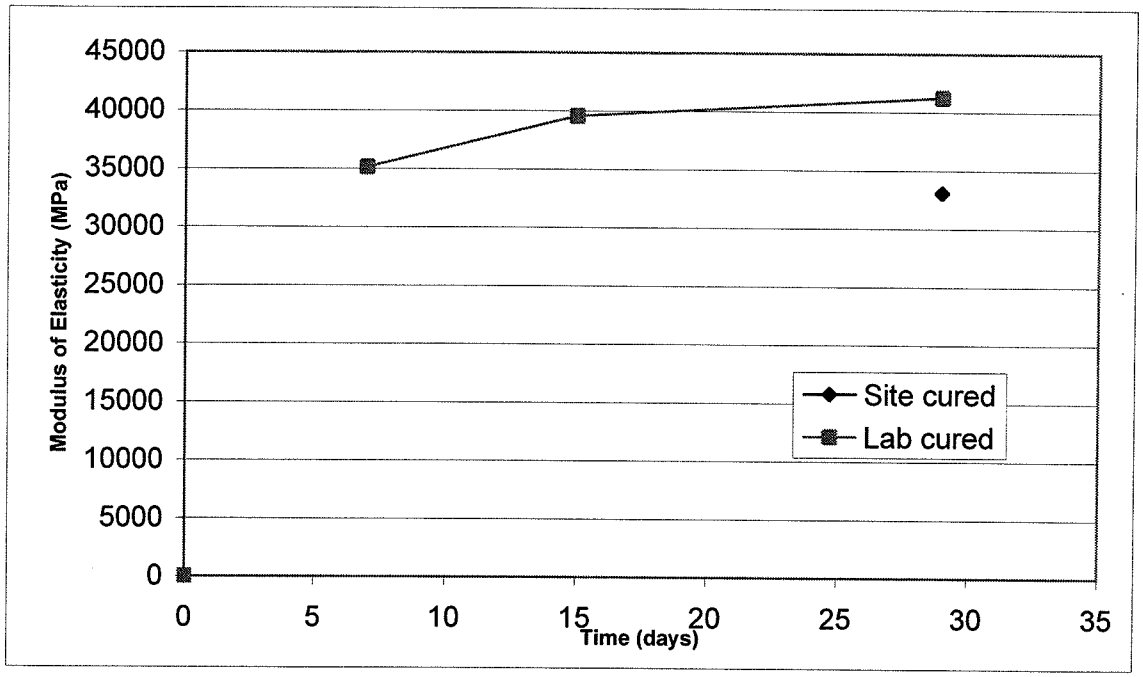
SITE CURED

	Modulus of Elasticity (MPa)			
Day	# 1	# 2	# 3	**Average**
3				
7				
15				
29	32954	33244	32996	**33064.67**
29DT	34795	34483	34230	**34502.67**

This data is the Ec data obtained from a cylinder cured on site at the same elevation as the curing slab. This was performed to determine if there is a difference between site cured on the ground and at the same height as the suspended slab

LAB CURED

	Modulus of Elasticity (MPa)			
Day	# 1	# 2	# 3	**Average**
3				
7	35062	35263	35108	**35144.33**
15	39443	39664	39602	**39569.67**
29	41061	41272	41457	**41263.33**



6th Floor Slab, North Pour

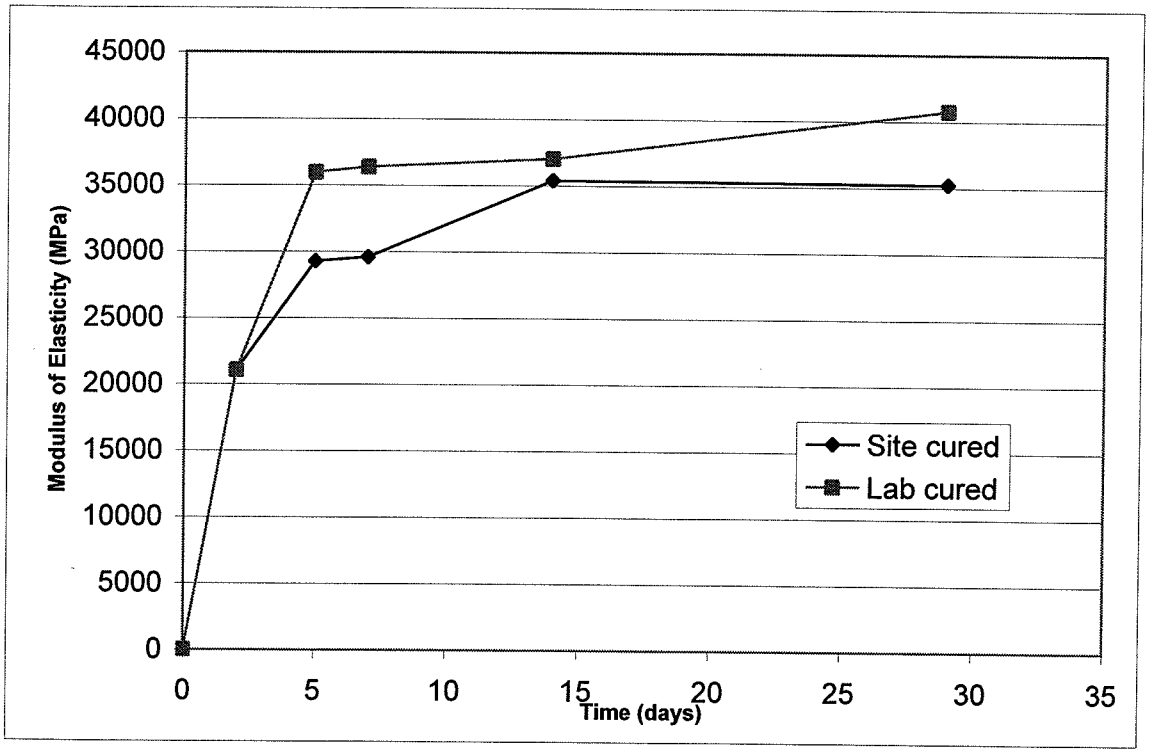
1day sample	21007	MPa
	20913	MPa
	21338	MPa
Average	21086	MPa

SITE CURED

	Modulus of Elasticity (MPa)			
Day	# 1	# 2	# 3	**Average**
5	29424	29178	29196	**29266**
7	29455	29668	29611	**29578**
14	35142	35704	35294	**35380**
29	34999	35473	35205	**35225.67**

LAB CURED

	Modulus of Elasticity (MPa)			
Day	# 1	# 2	# 3	**Average**
5	35530	36361	35982	**35957.67**
7	36232	36424	36482	**36379.33**
14	36681	37193	37174	**37016**
29	40537	40619	41156	**40770.67**



7th Floor Slab, South Pour

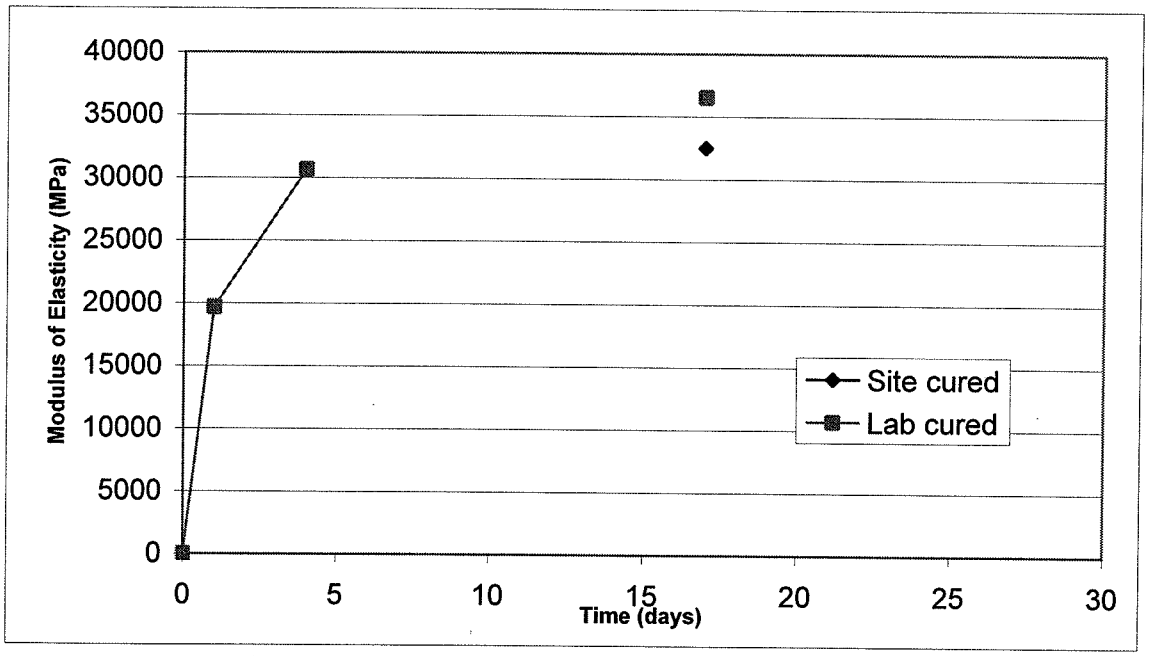
1day sample		19518	MPa
		19731	MPa
		19755	MPa
	Average	19668	MPa

SITE CURED

	Modulus of Elasticity (MPa)			
Day	# 1	# 2	# 3	**Average**
4				
7				
17	32313	32654	32514	**32493.67**
28				

LAB CURED

	Modulus of Elasticity (MPa)			
Day	# 1	# 2	# 3	**Average**
4	30669	30545	30751	**30655**
7				
17	36397	36600	36629	**36542**
28				



G25

3rd Floor
North
7 days.

2/7/05

156
159.4
136.6
220.6

YOUNGS MODULUS TEST

Load (KN)	Deflection (Div.)								
	~~Group~~ 3NS5			~~Group~~ 3NL5			Group 3		
	Run 1	Run 2	Run 3	Run 1	Run 2	Run 3	Run 1	Run 2	Run 3
0	0	0	0	0	0	0			
10	3	3.5	3.1	~~3.2~~ ~~5.6~~ 3.2	2.4	2.0			
20	9.5	9.3	~~8.4~~ ~~8.4~~	~~7.8~~ ~~7.8~~	7.0	6.4			
30	13.9	17.8	16.9	11.9	11.8	10.6			
40	21.8	22.3	23.5	18.3	18.5	17.2			
50	29.3	29.6	31.9	23.5	23.2	21.9			
60	38.1	38.1	39.2	29.9	29.3	28.6			
70				35.7	36.1	34.9			

Note:

Gauge length = ~~130~~ 132 mm

Conversion: 1 Div. = 0.002 mm

28/6/05

$F = \sigma a$

$\sigma = F/\pi r^2$

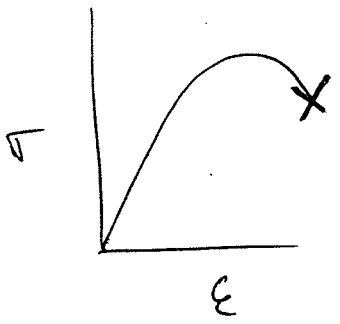
YOUNGS MODULUS TEST

Load (KN)	Deflection (Div.)									
	Group NO. 2 - 40kN			Load	Group 25S11 - 80kN			Group 3 25L12 - 120 kN		
	Run 1	Run 2	Run 3		Run 1	Run 2	Run 3	Run 1	Run 2	Run 3
5	1/4	1	1	10	4	3	2.5	10 3	2	2
10	3	4	4	20	7	6	7	20 6	5	6
15	6	6	7	30	12.5	12	13	30 11	9	9
20	9	9	10	40	18	17	17	40 15	13	14
25	13	13	14	50	22	23	22.5	50 20	17	18
30	17	17.5	18	60	29	28	28	60 25	21	22
35	21	22	21.5	70	34	34	34	70 29	27	27
				80	40.5	39	40	80 33	30.5	31
								90 38	36	36
								100 43	40	41
								110 47	45	46
								120 52	48	48

Note:

Gauge length = ~~130~~ 132 mm

Conversion: 1 Div. = 0.002 mm remember to ÷ 2.



YOUNGS MODULUS TEST

11/7/05

Load (KN)	Deflection (Div.)								
	~~Group~~ 3528			~~Group~~ 3558			Group 3		
	Run 1	Run 2	Run 3	Run 1	Run 2	Run 3	Run 1	Run 2	Run 3
10	1	1	2	3	3	3			
20	5	5	5	8	8	9			
30	9	9	10	15	14	14			
40	15	14	16	19	21	20			
50	20	20	21	26	27	28			
60	25	25	25	32	32	33			
70	30	30	32	38	39	39			
80	37	36	38	45	45	46			
90	41	42	43	51	51	52			
100	47	46	47						
110	52	52	52						

Note:

Gauge length = ~~130~~ 132 mm

Conversion: 1 Div. = 0.002 mm