



GAUTENG PROVINCE

ROADS AND TRANSPORT
REPUBLIC OF SOUTH AFRICA

Road Pavements Forum

HVS testing of Roller Compacted Concrete test section at Rayton

Louw du Plessis
5 – 6 November 2013

Contents

- Construction
- FWD results
- Preliminary HVS results
- cncPAVE structural analysis

Pavement Design



150mm RCC

150mm C4 Base (G5 parent), 97 Mod AASHTO

150mm G5 Upper Select SB 95% Mod AASHTO

150mm G7 Lower Select SB 93% Mod AASHTO

125 G7 fill Gravel 90% Mod AASHTO

Rip and recompact to 90% Mod AASHTO

Design life: ES3 (0.3 – 3 million ESA)



Construction



C4 base layer







AZ
PLANT HIRE
Tel: 011 462 7907
www.azplant.co.za

CATERPILLAR

AZ PLANT HIRE

19

CAT

1420
G300E





RCC construction

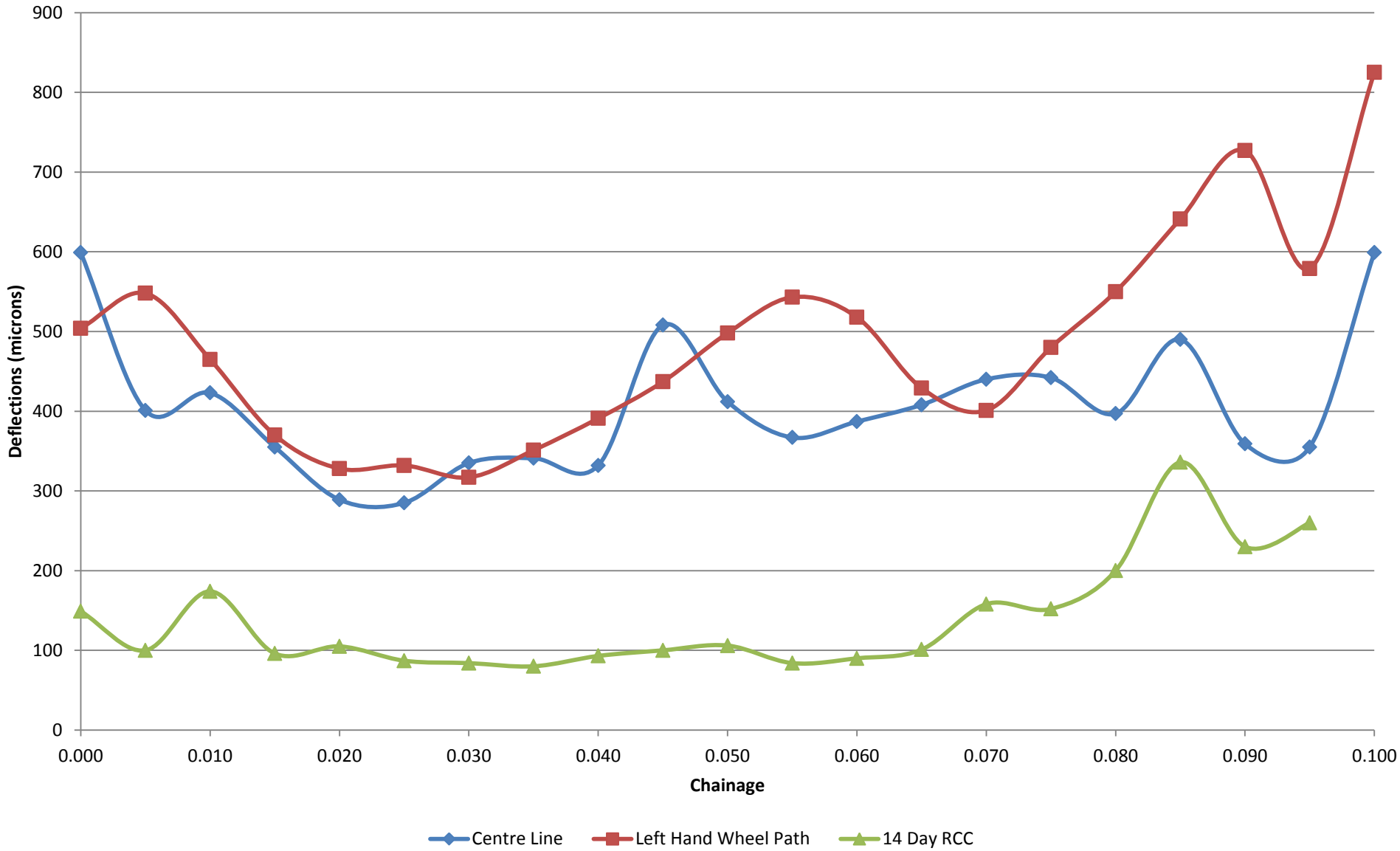






28day Strength: 29-32MPa

FWD data: on Subbase and on RCC (14day strength)

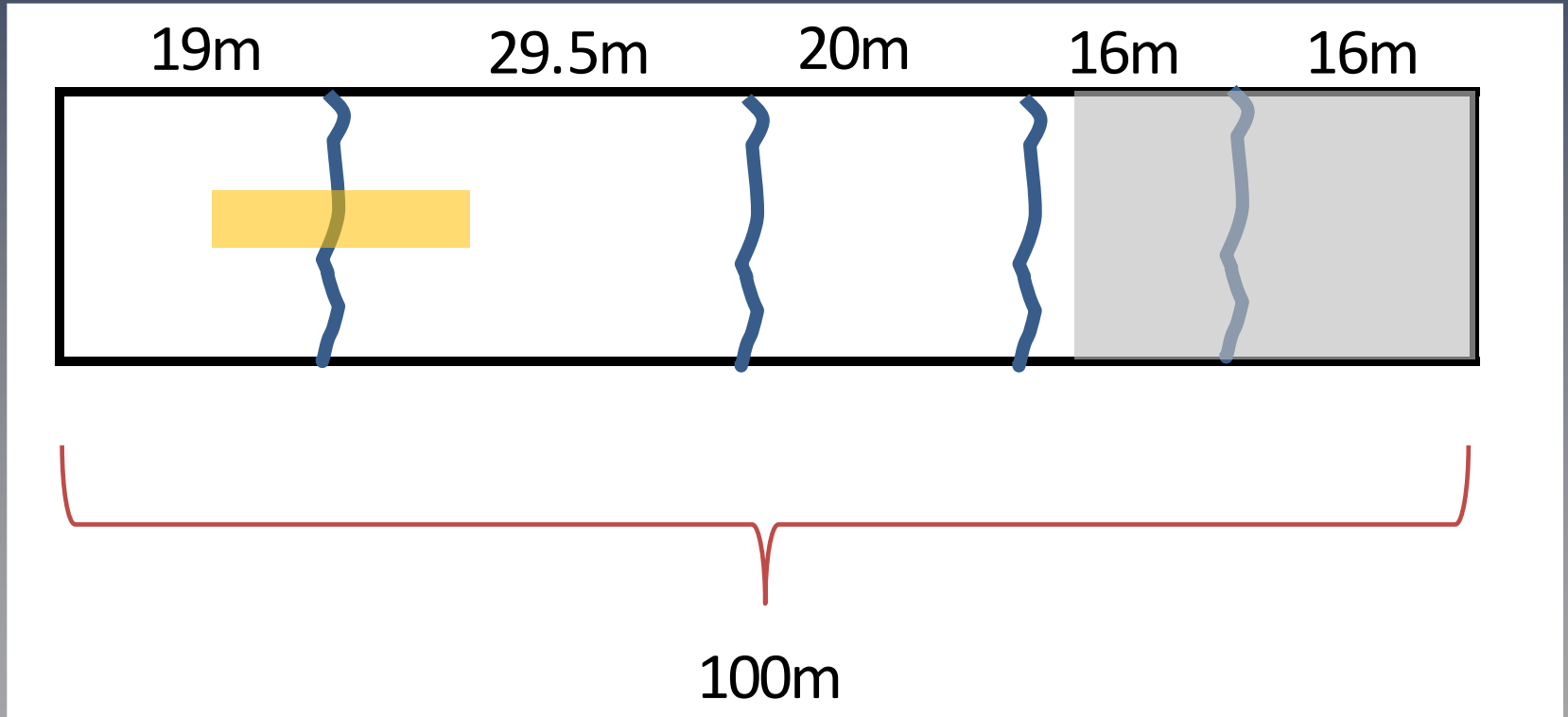






01.07.2013

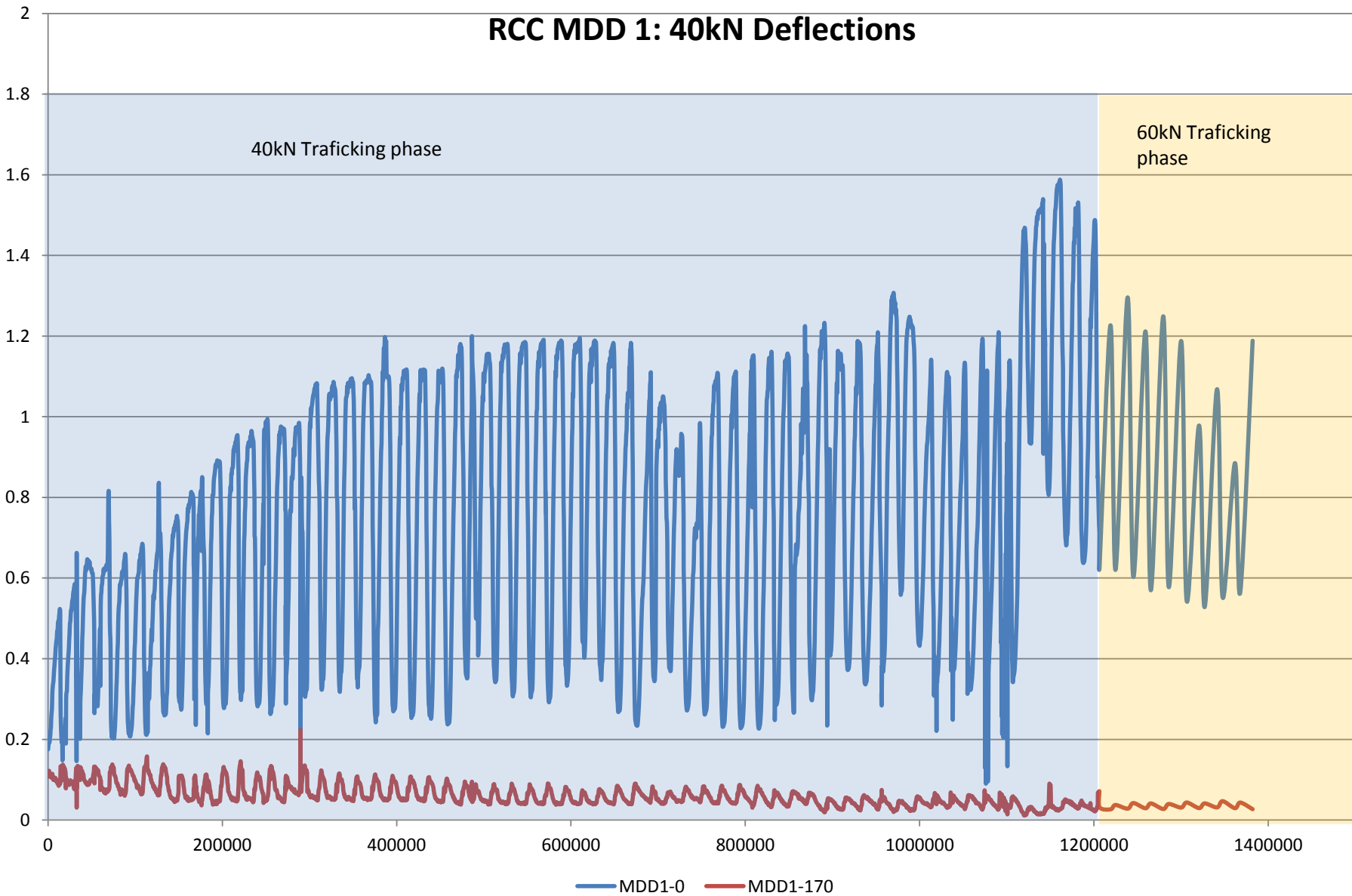
Crack Pattern



SEC: 470A5
REPS: NIO
DATE: 01/07/2013
TIME: 14:28
LOAD: 40 KN
PAINT: -
CRACKS: NO CRACKS

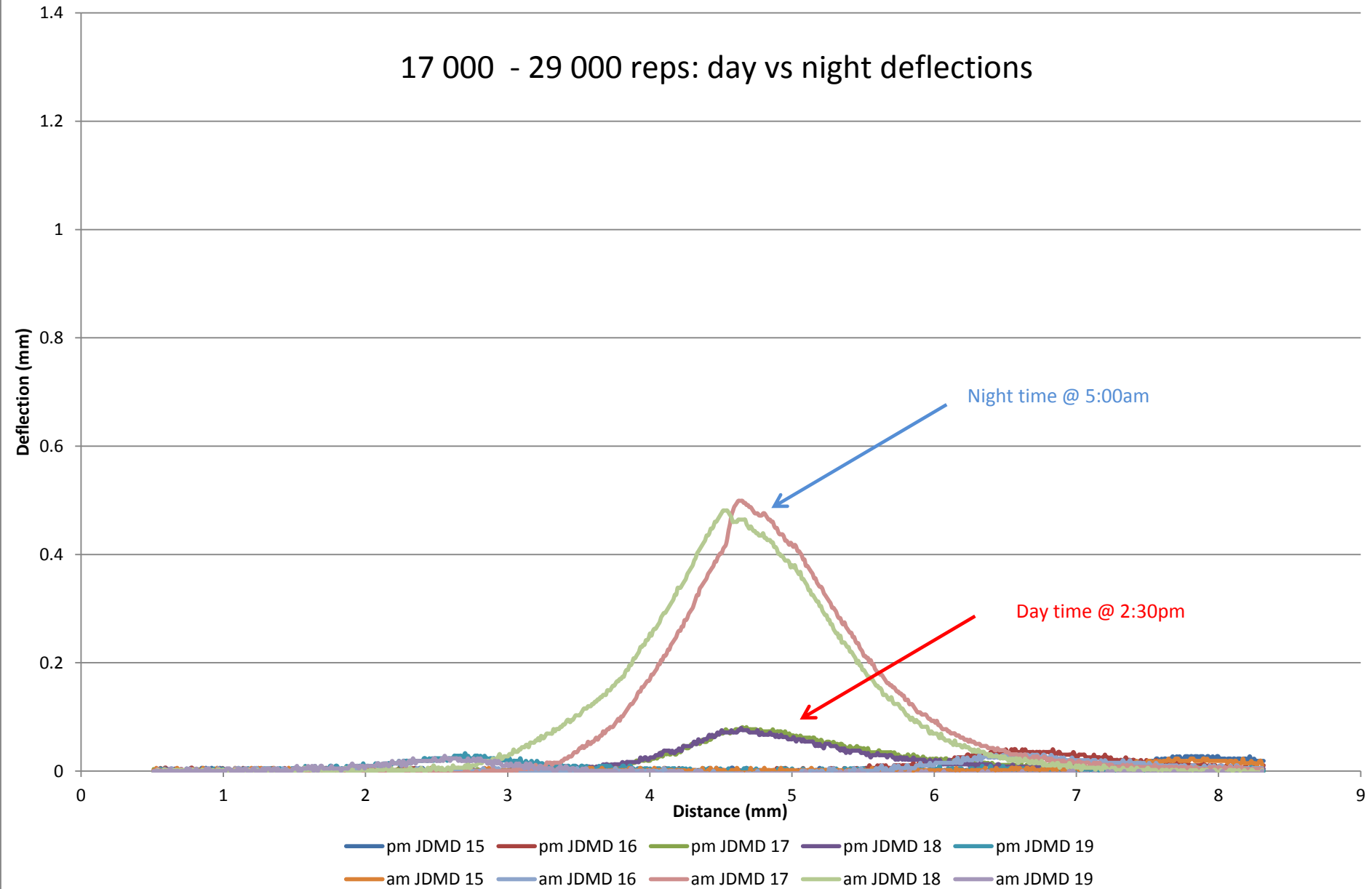
01.07.2013

RCC MDD 1: 40kN Deflections

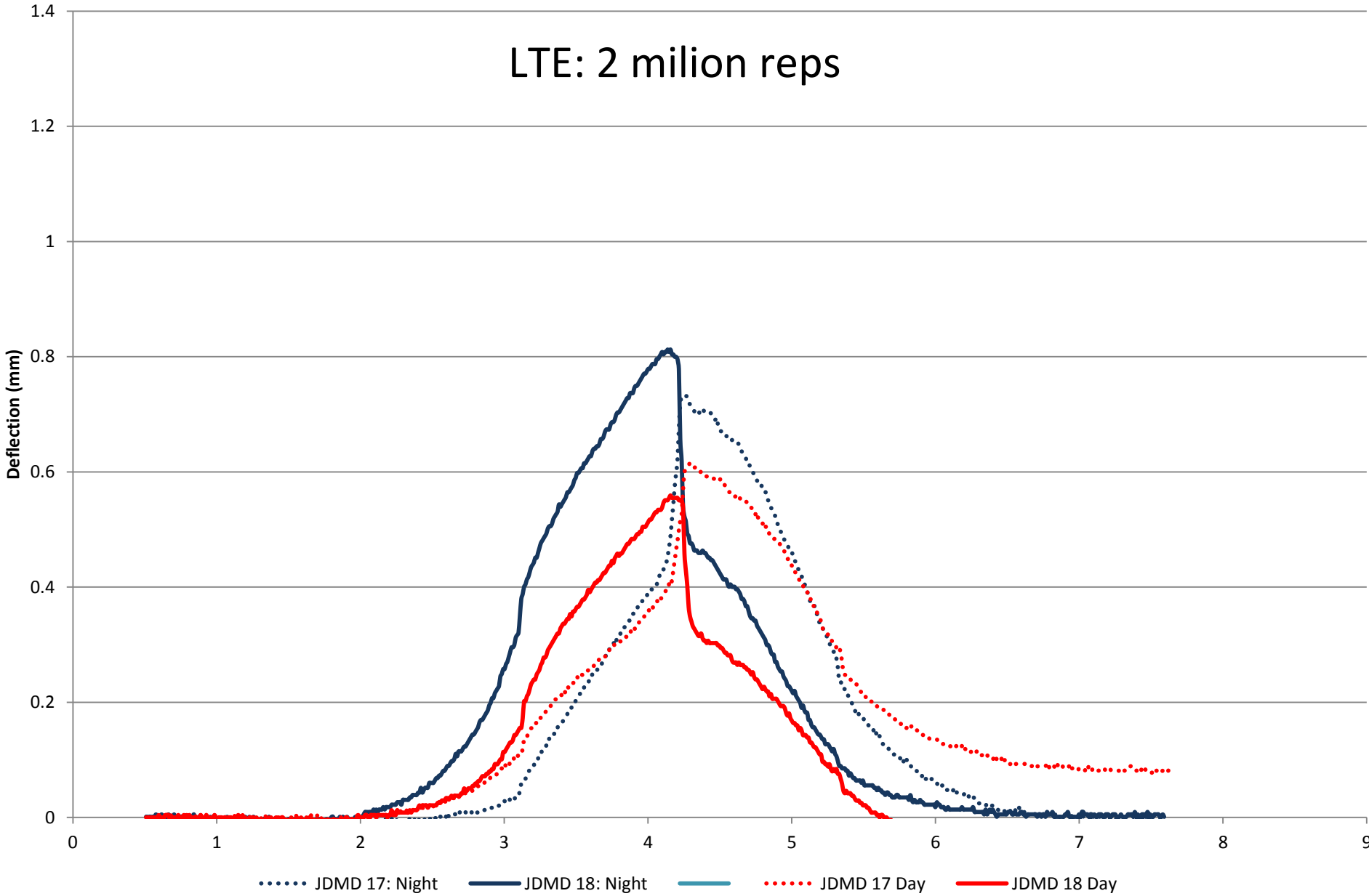


Joint behaviour

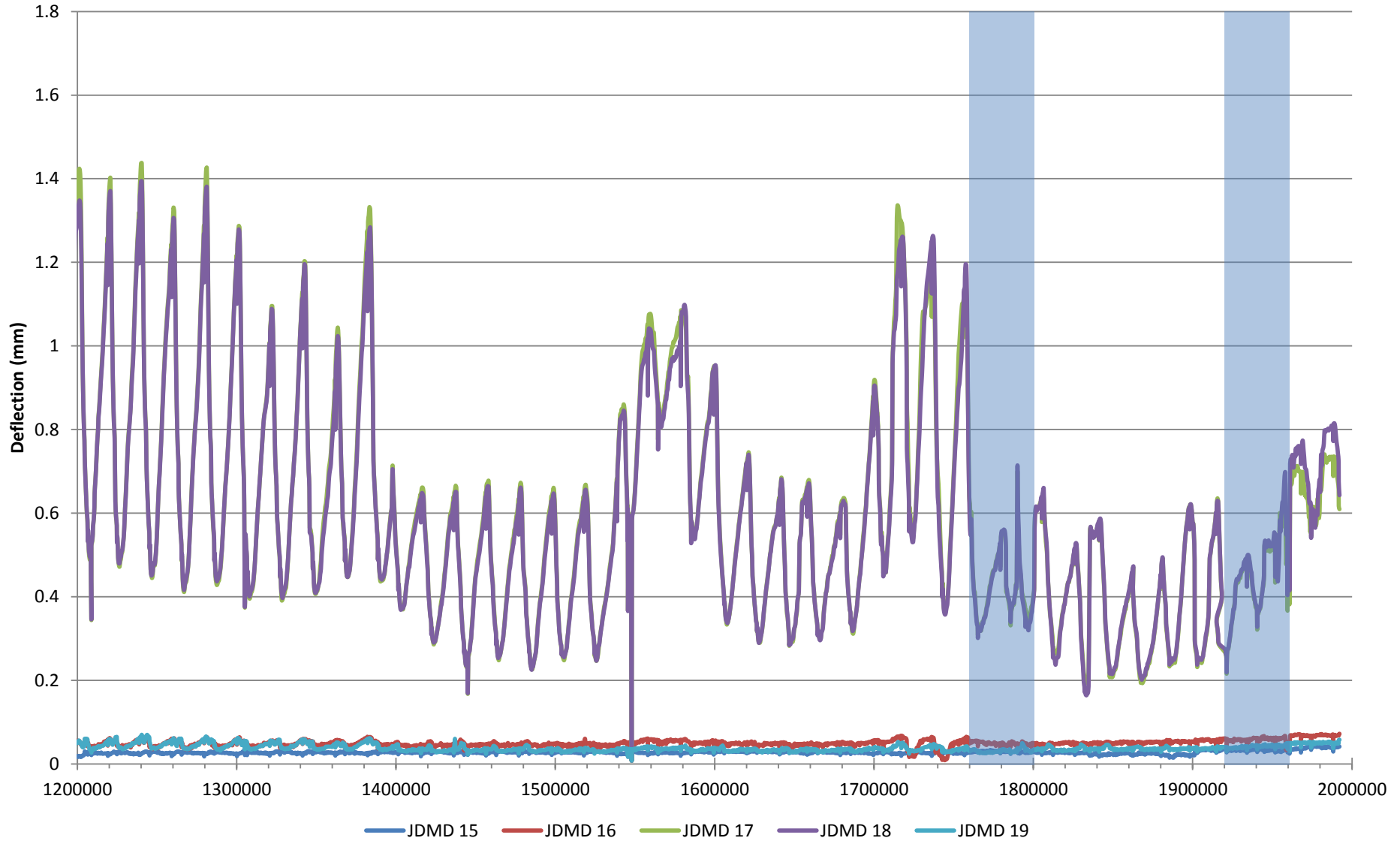
17 000 - 29 000 reps: day vs night deflections



LTE: 2 milion reps



Edge Deflections during the watering cycle



cncPave analysis

cncPAVE5, v0.6, ©2013 P Strauss and M Slavik (su12e)

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V	Variable	Min q	Best	Max q
1	Cement content, kg/m3	0.9	340	1.10
2	Water content, l/m3	0.90	170	1.30
3	Flexural strength, MPa	0.75	4.2	1.60
4	Layer 1 (slab) h1, mm	0.95	150	1.10
5	Layer 2 (subb) E2, MPa	0.67	1750	1.50
6	Layer 2 (subb) h2, mm	0.85	150	1.20
7	Layer3 E3, MPa	0.80	185	1.30
8	Layer3 h3, mm	0.80	150	1.30

C	Constant	Value
11	Erosion factor	4
12	Joint spacing, m	1
13	Steel diameter, mm	0
14	Steel spacing, mm	0
15	Aggregate Crushing Value	20
16	Aggregate type	1
17	Aggregate size, mm	37
18	Cement type	1
19	Aggreg. content factor	0.72

SH %

Shattered Slabs

PU %

Pumping

FA %

Faulting

LC, R/m2

Keep input Type of concrete pavement: J D CR UT

RCC at Rayton site

50000 simulations done in 2.13 s

Simuls: 50000

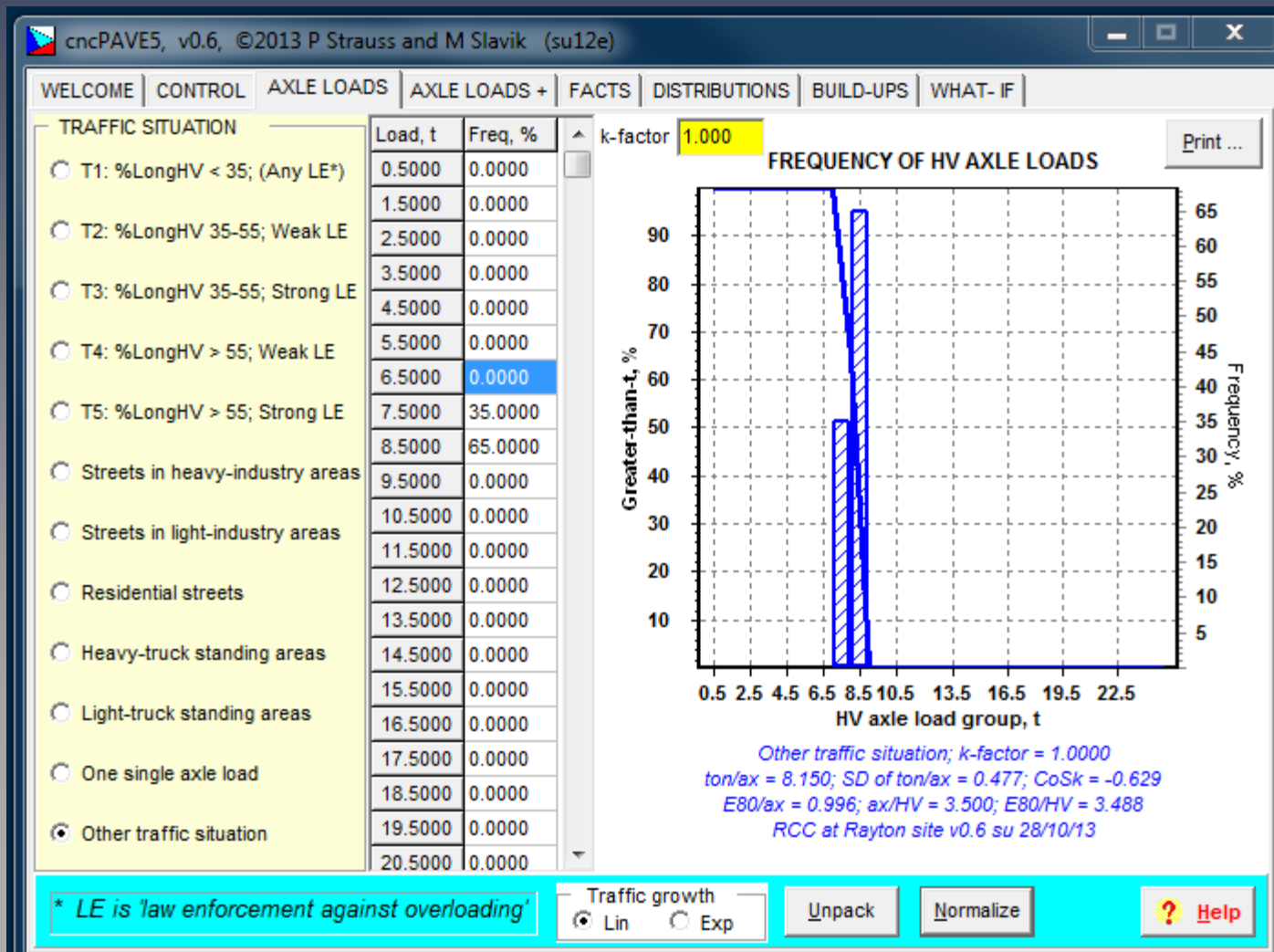
Import Export

Abort RUN

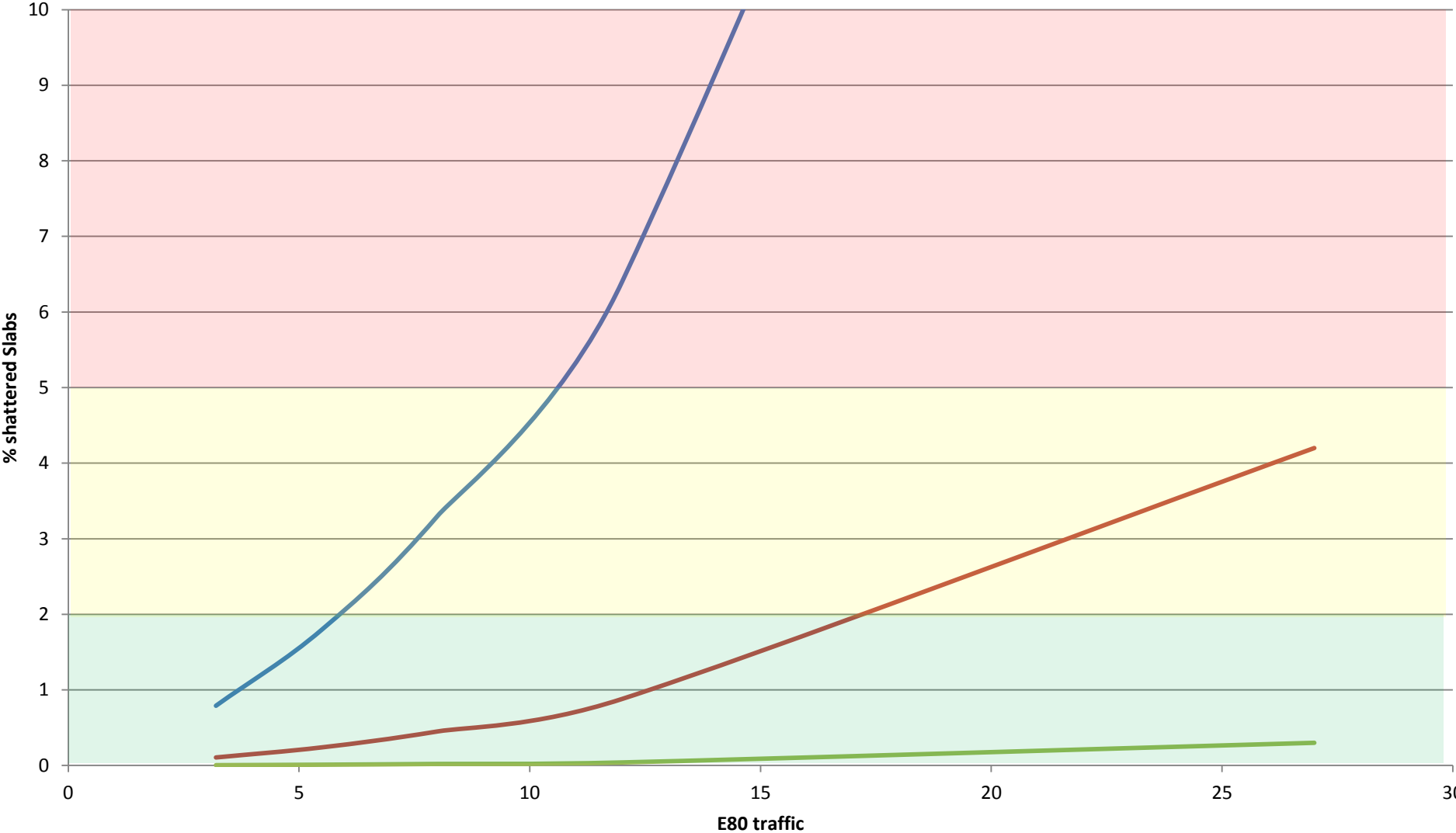
Input Guide Time t1 to 1st rehab., yrs: 20.0

Help

Loading: a single 80kN axle load



Estimated traffic



— Joint Spacing 6m — Joint Spacing 4m — Joint Spacing = 2m

Current HVS results vs cncPave

% shattered slabs vs E80s			
years	E80	Joint Spacing 6m	Defl
3	3.2	0.79	0.116
5	5.5	1.8	0.125
7	8	3.3	0.135
10	12	6.4	0.146
20	27	28	0.193
years	E80	Joint Spacing 4m	Defl
3	3.2	0.106	0.074
5	5.5	0.24	0.08
7	8	0.45	0.085
10	12	0.88	0.093
20	27	4.2	0.117
years	E80	Joint Spacing 2m	Defl
3	3.2	0.004	0.036
5	5.5	0.01	0.039
7	8	0.02	0.042
10	12	0.04	0.047
20	27	0.3	0.062