TABLE OF CONTENTS

APPENDIX D

GATE END BOXES

The total consumption of the Gate end boxes was measured at the supply from each section's 1250 kVA flameproof transformer. The Gate end boxes supply power to all the equipment used in the production except for the CM. Measurements were made on the supply to the Gate end boxes for a number of shifts as can be seen in Table D-1.

Table D-1: Measuring period for a CM at each section.

		17-May-2005	18-May-2005	19-May-2005	23-May-2005	24-May-2005	25-May-2005
Section 21	Morning shift	X	X	X	-	-	-
	tonnes/CM/shift	858	1320	1716	1320	1650	1749
	Afternoon shift	X	X	X	-	-	-
	tonnes/CM/shift	2145	2112	2013	2310	1980	1980
Section 61	Morning shift	-	-	-	X	X	X
	tonnes/CM/shift	1740	2175	2233	1740	1450	2320
	Afternoon shift	-	-	-	X	X	X
	tonnes/CM/shift	1682	2552	2320	2030	2320	1160

X - measurements made for shift, at specific section.

Gate end boxes are supplied with power from the 1250 kVA flameproof transformer with a 95 mm^2 trailing cable. The cable is rated for a current of 295 A at an ambient temperature of 30 °C. The derating factor for an ambient temperature of 25 °C is 1.1, which gives a current rating of 325 A for the cable. The busbar of the Gate end boxes are rated for only 300 A.

D.1 LOAD PROFILE

The next section focuses on the load profiles of the Gate end boxes. Each graph shows the line voltage and the voltage limits, the load current and rated current capacity of the busbar. The morning shifts and afternoon shifts are separated as well as the measurements made at the different sections.

D.1.1 SECTION 21

D.1.1.1 Morning shifts

Table D-2: Reasons for breakdowns and absent data.

Date	Time start	Time stop	Reason for breakdown or no data
17-May-2005	SOS 12:35	09:30 14:05	Section belt electrical fault. CM trailing cable faulty.
18-May-2005	SOS	08:50	CM trailing cable faulty.
19-May-2005	07:20	08:30	CM trailing cable faulty.

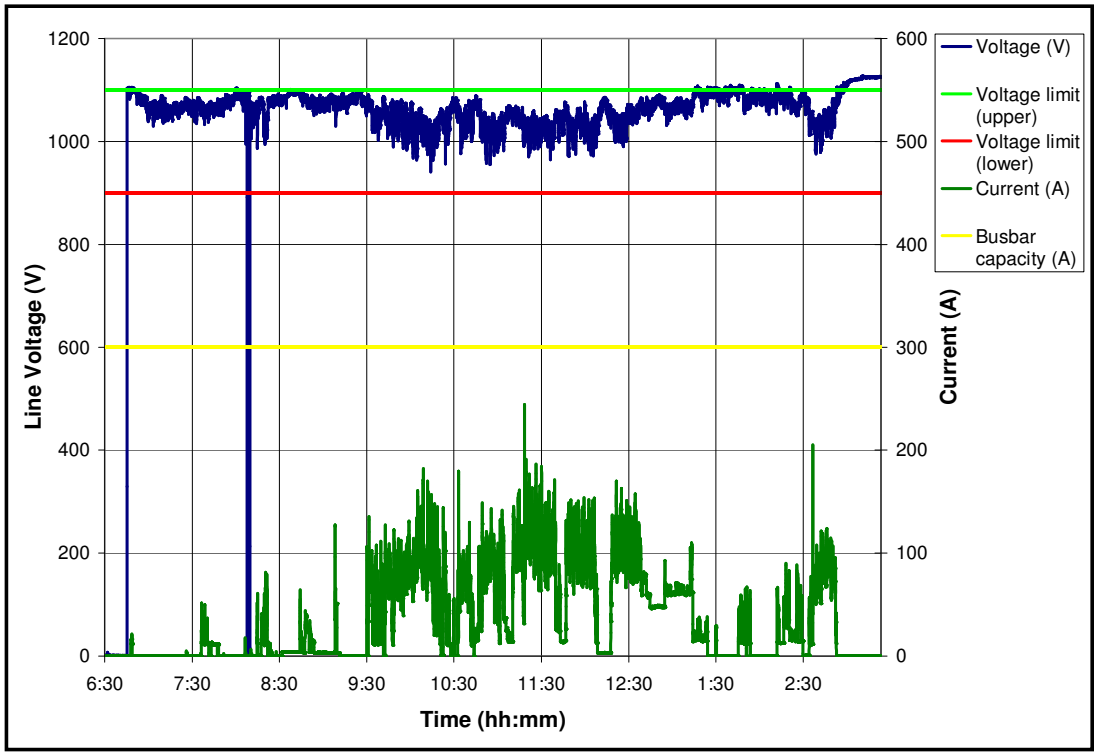

Figure D.1-1: Load current and voltage for a GEB – 17 May 2005.

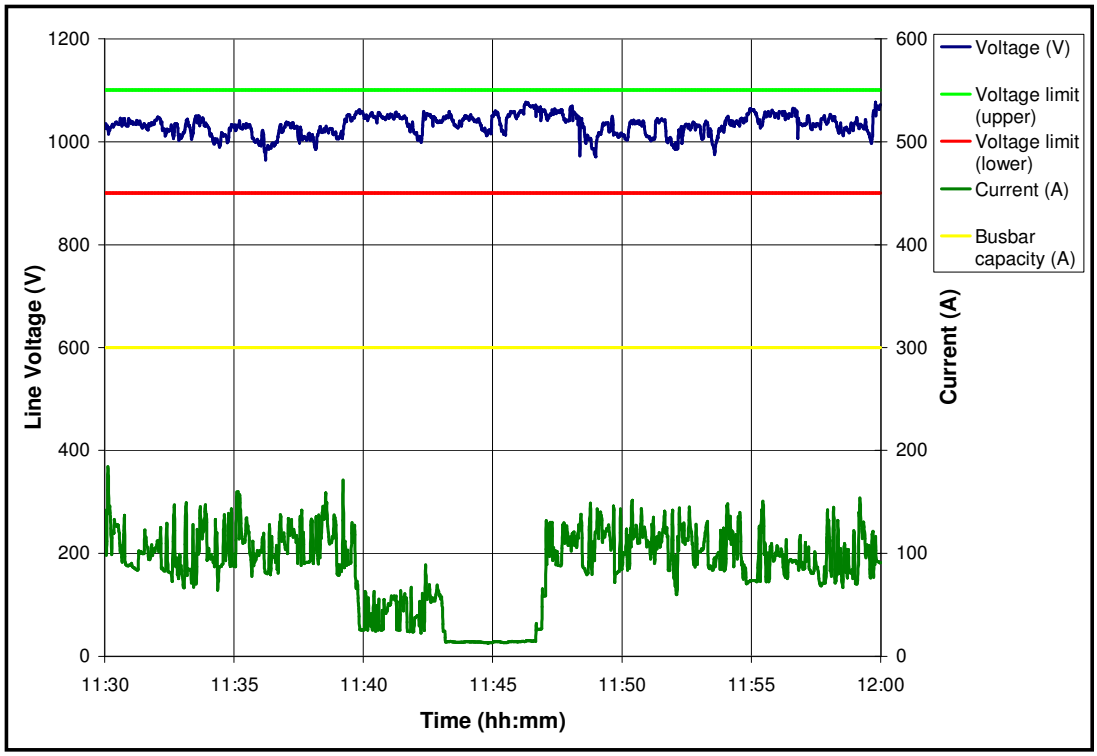

Figure D.1-2: Load current and voltage for a GEB –17 May 2005 (30 minute period).

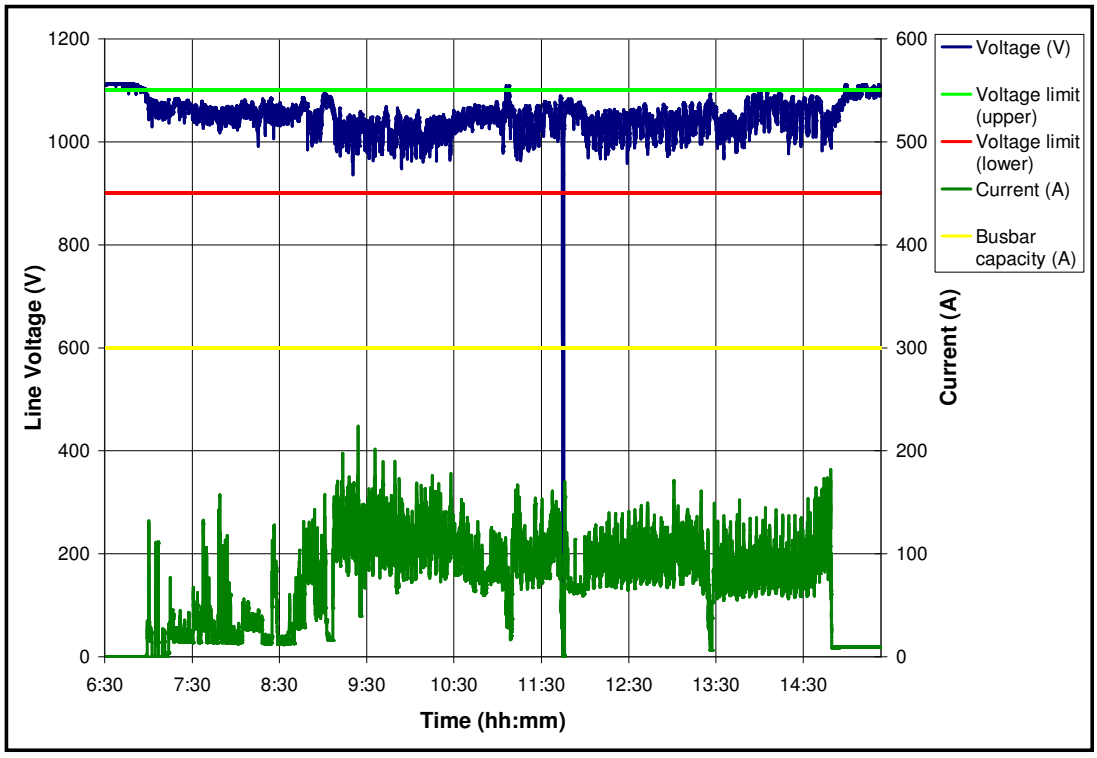

Figure D.1-3: Load current and voltage for a GEB – 18 May 2005.

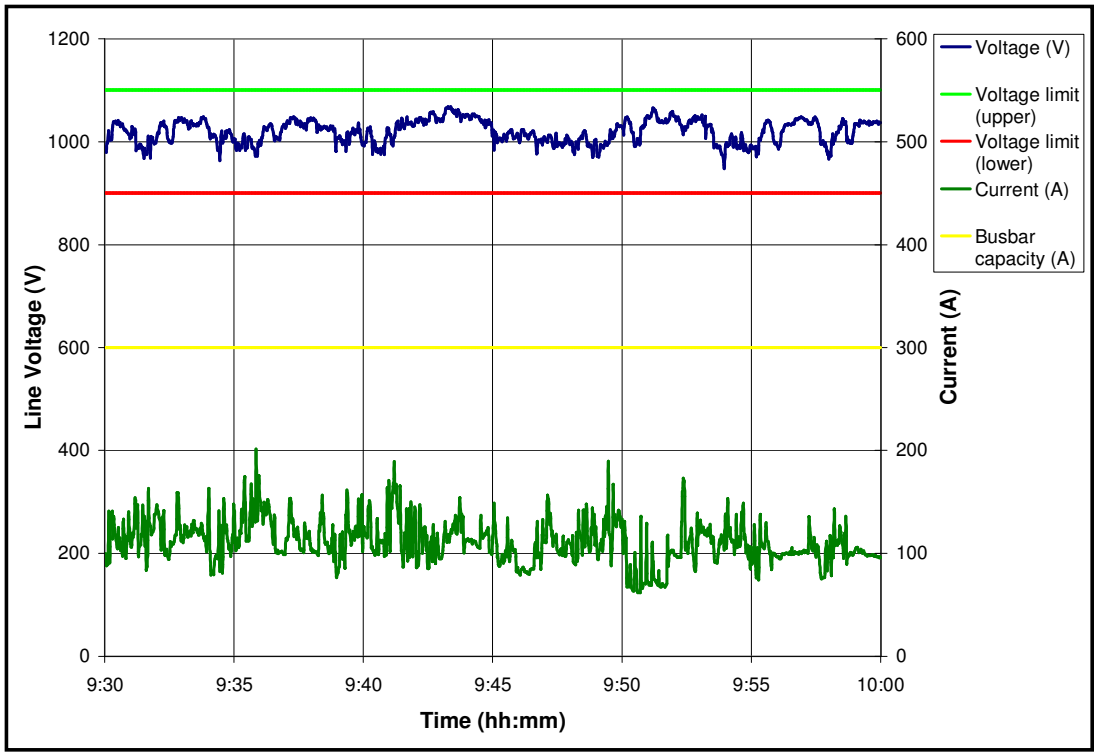

Figure D.1-4: Load current and voltage for a GEB – 18 May 2005 (30 minute period).

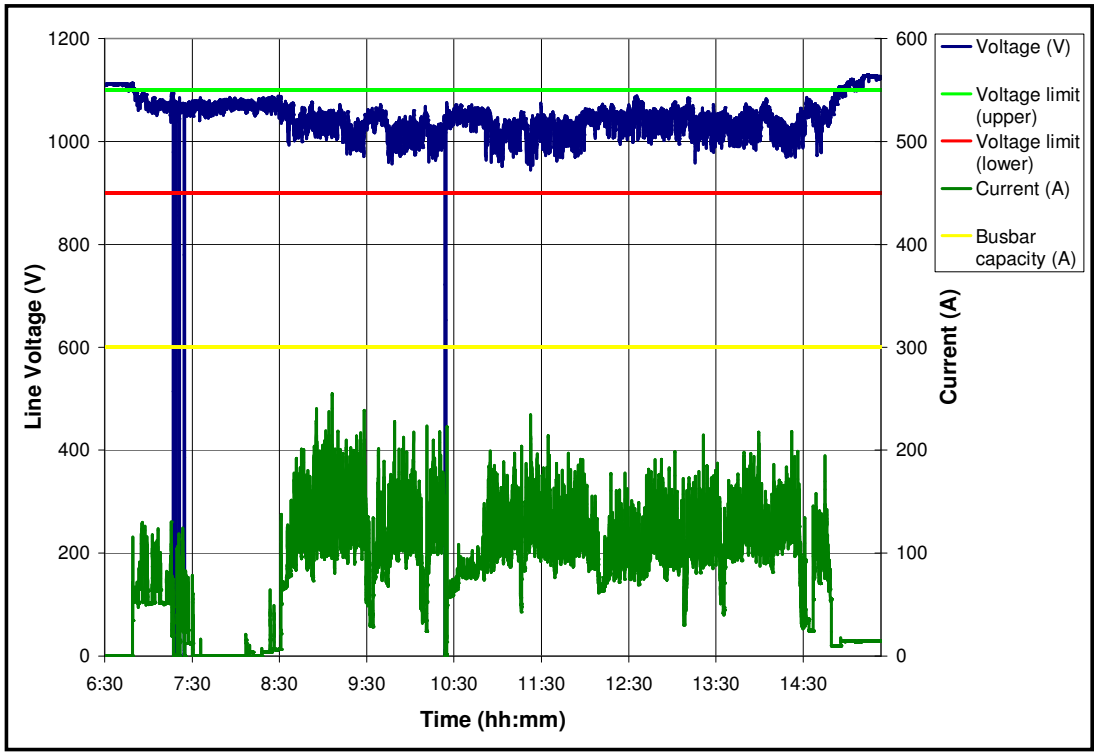

Figure D.1-5: Load current and voltage for a GEB – 19 May 2005.

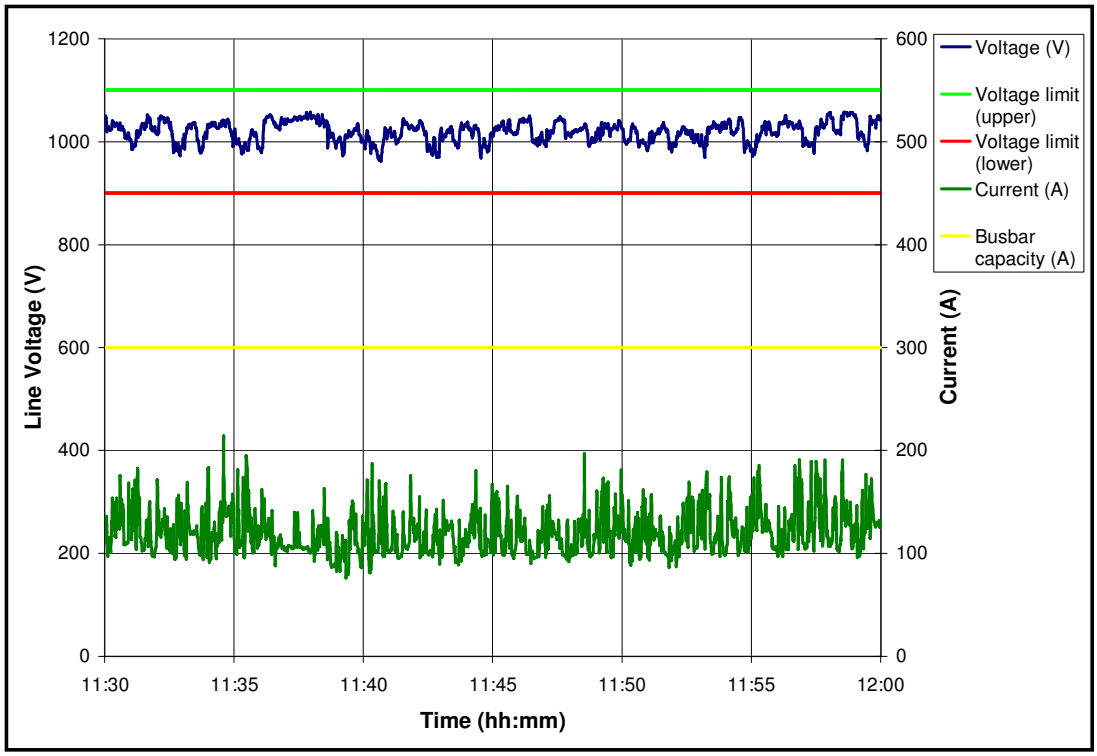

Figure D.1-6: Load current and voltage for a GEB – 19 May 2005 (30 minute period).

D.1.1.2 Afternoon shifts

Table D-3: Reasons for breakdowns and absent data.

Date	Time start	Time stop	Reason for breakdown or no data
17-May-2005	23:14	EOS	No voltage data - recorder stopped recording.
	23:53	EOS	No current data - recorder stopped recording.
18-May-2005	20:30	EOS	No current data - recorder stopped recording.
	22:34	EOS	No voltage data - recorder stopped recording.
19-May-2005	20:53	EOS	No current data - recorder stopped recording.
	22:44	EOS	No voltage data - recorder stopped recording.

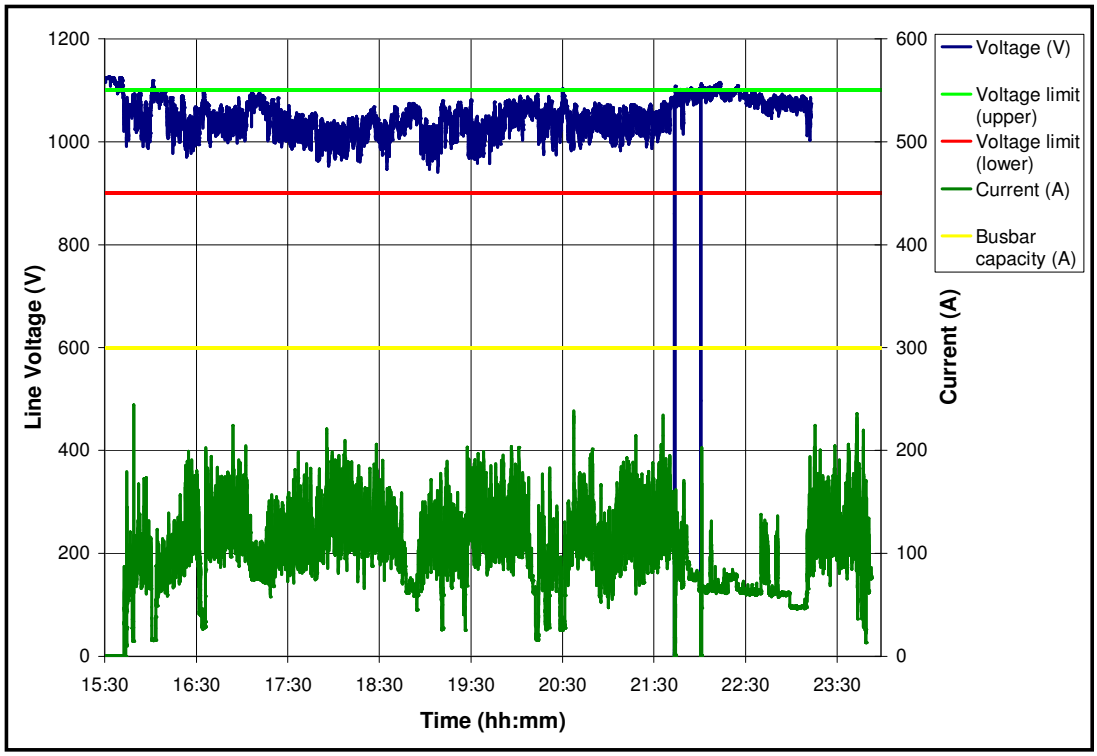

Figure D.1-7: Load current and voltage for a GEB – 17 May 2005.

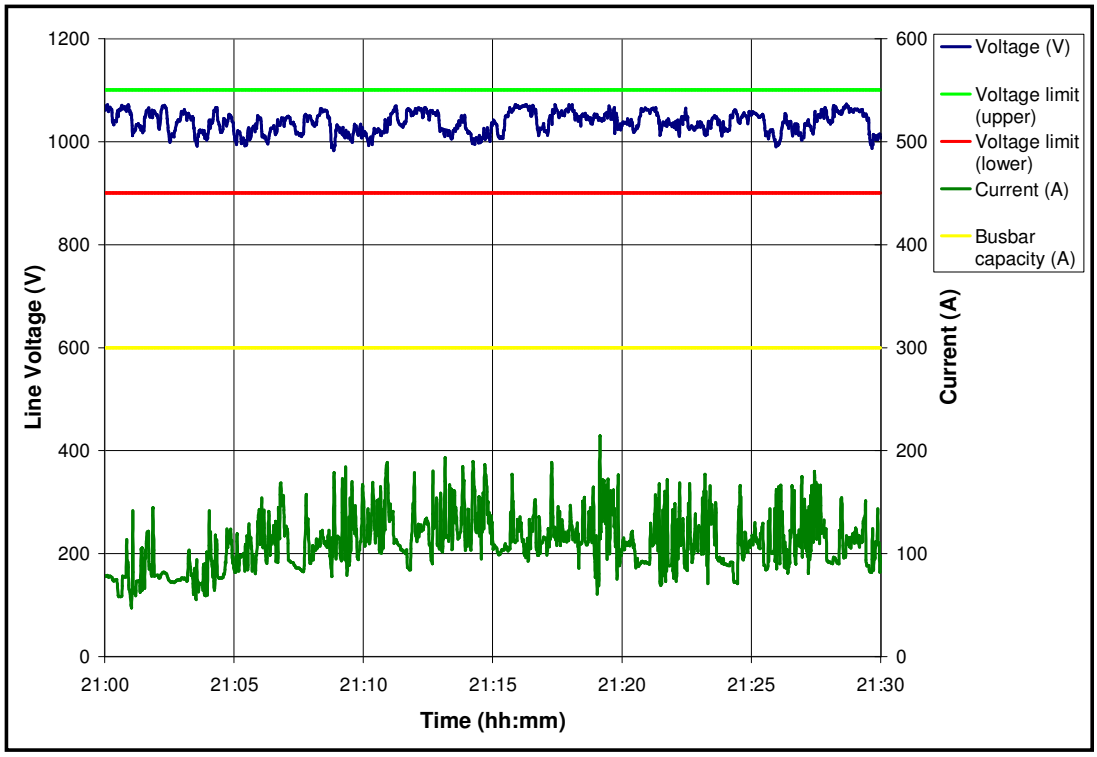

Figure D.1-8: Load current and voltage for a GEB – 17 May 2005 (30 minute period).

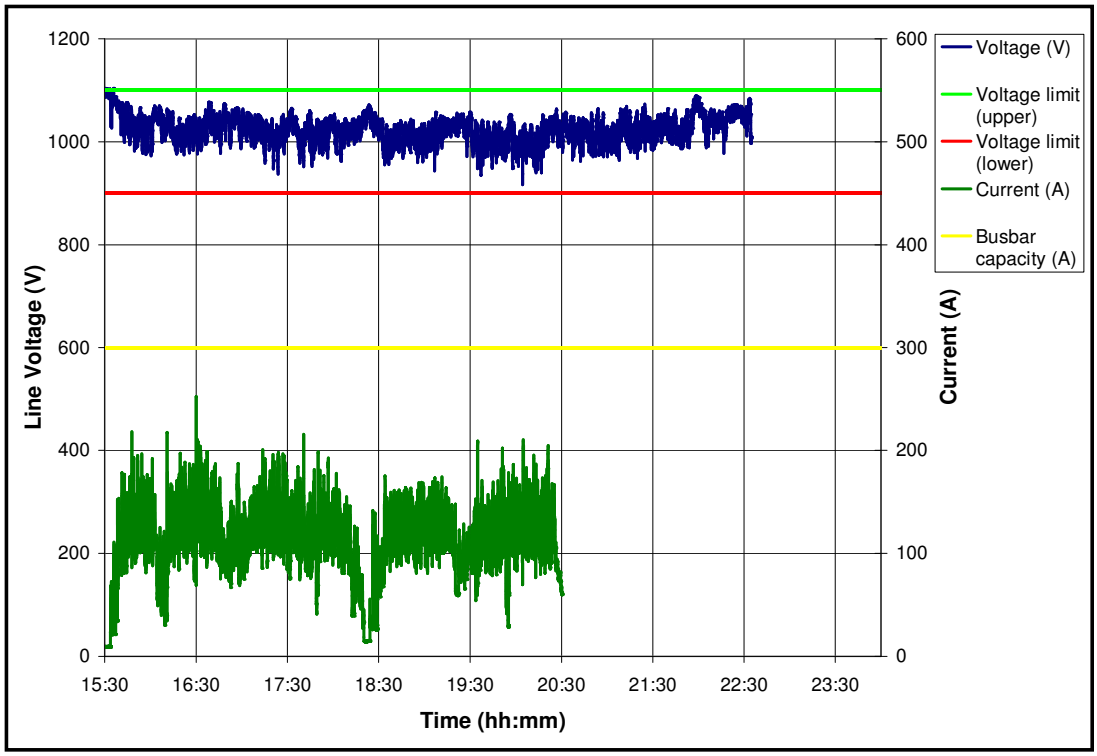

Figure D.1-9: Load current and voltage for a GEB – 18 May 2005.

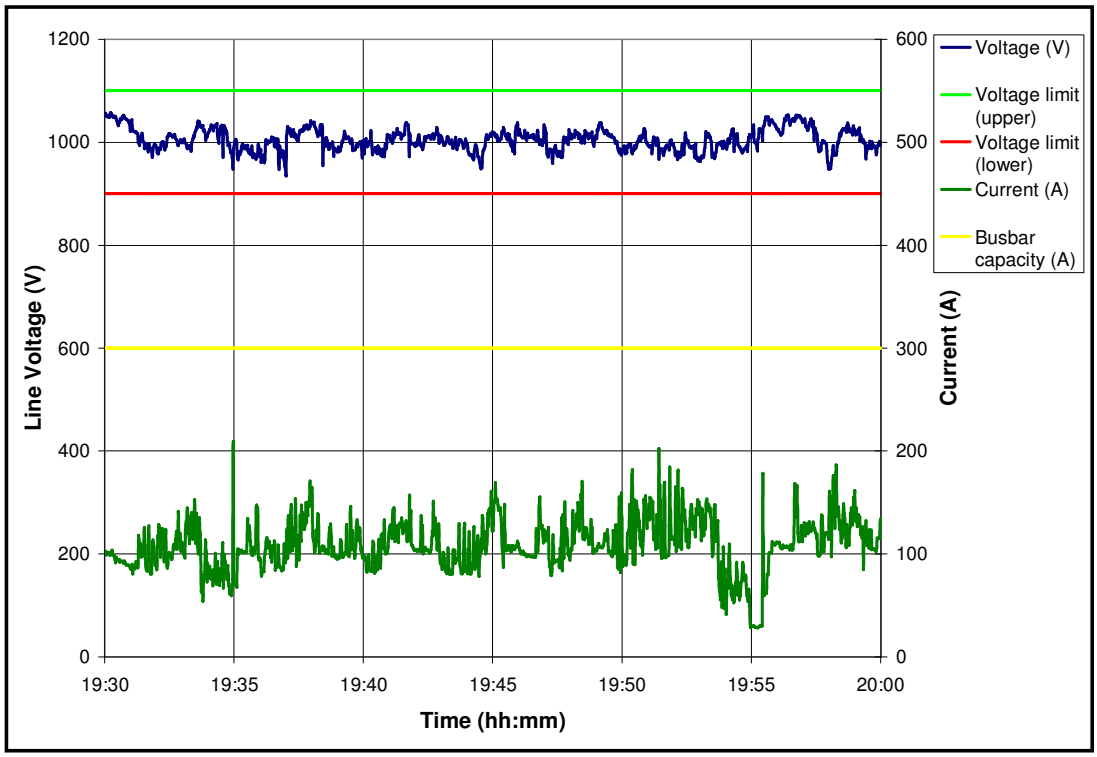

Figure D.1-10: Load current and voltage for a GEB – 18 May 2005 (30 minute period).

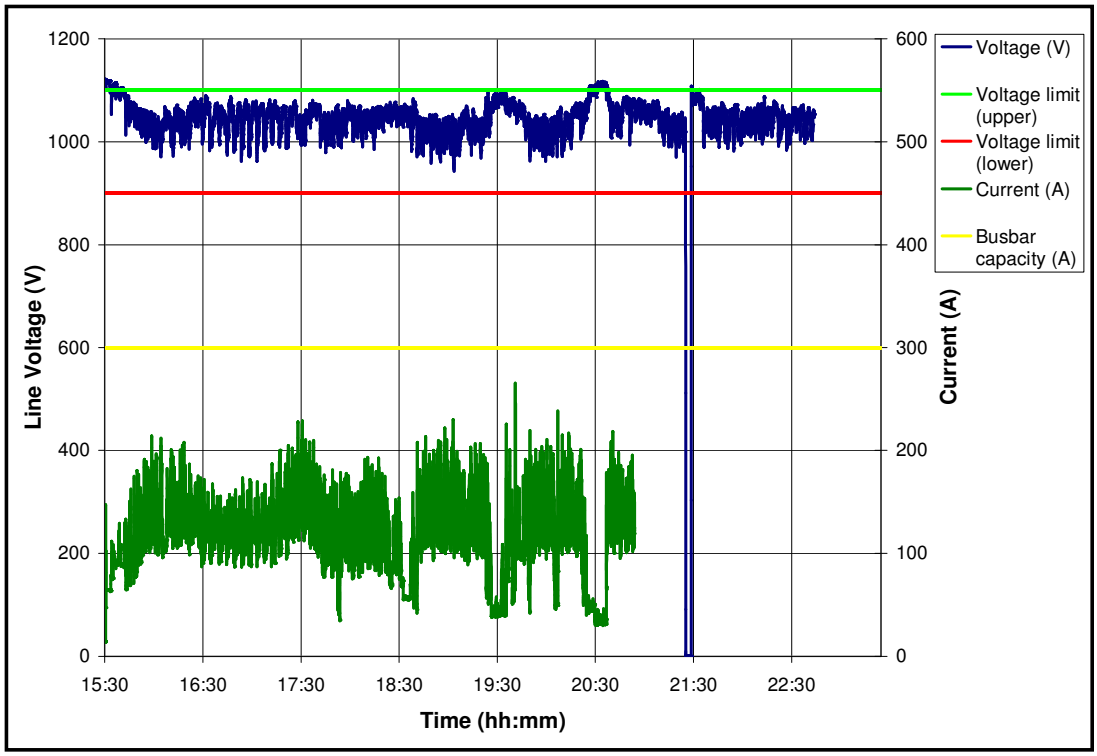

Figure D.1-11: Load current and voltage for a GEB – 19 May 2005.

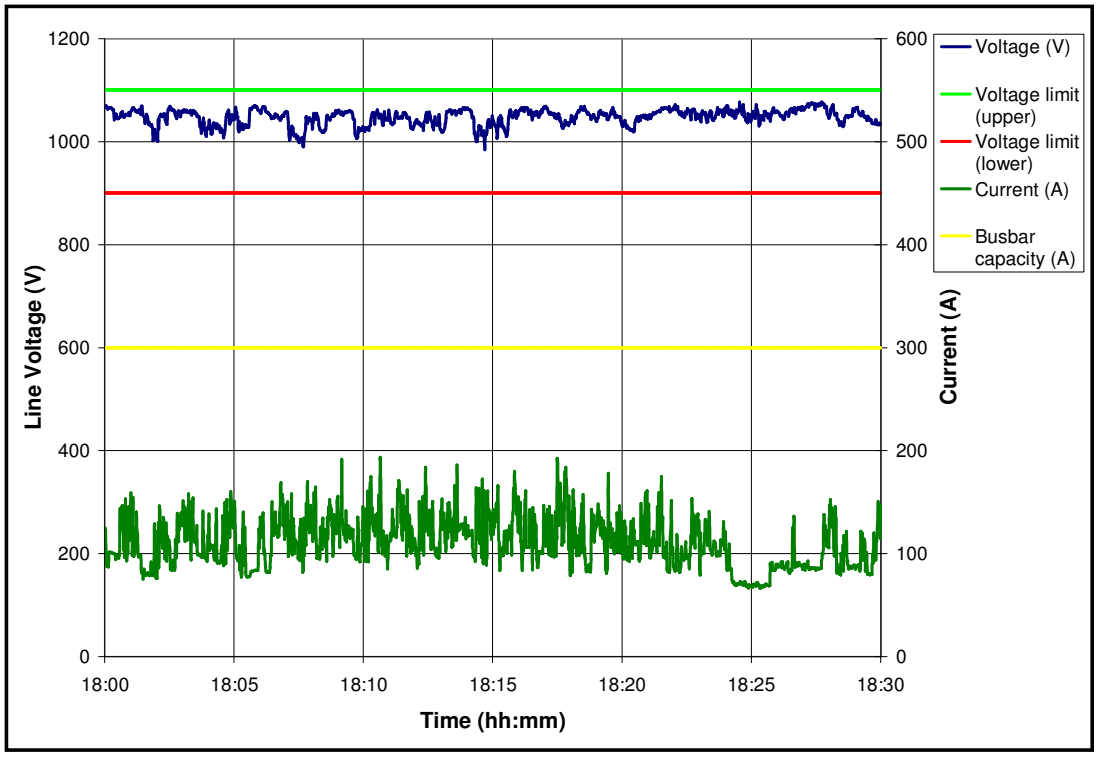

Figure D.1-12: Load current and voltage for a GEB – 19 May 2005 (30 minute period).

D.1.2 SECTION 61

D.1.2.1 Morning shifts

Table D-4: Reasons for breakdowns and absent data.

Date	Time start	Time stop	Reason for breakdown or no data
23-May-2005	14:40	EOS	Conveyor belt lockout.
24-May-2005	SOS 09:10	09:10 10:50	GEB - Earth fault. No service water.
25-May-2005	14:45	EOS	Conveyor belt torn - 12 m.

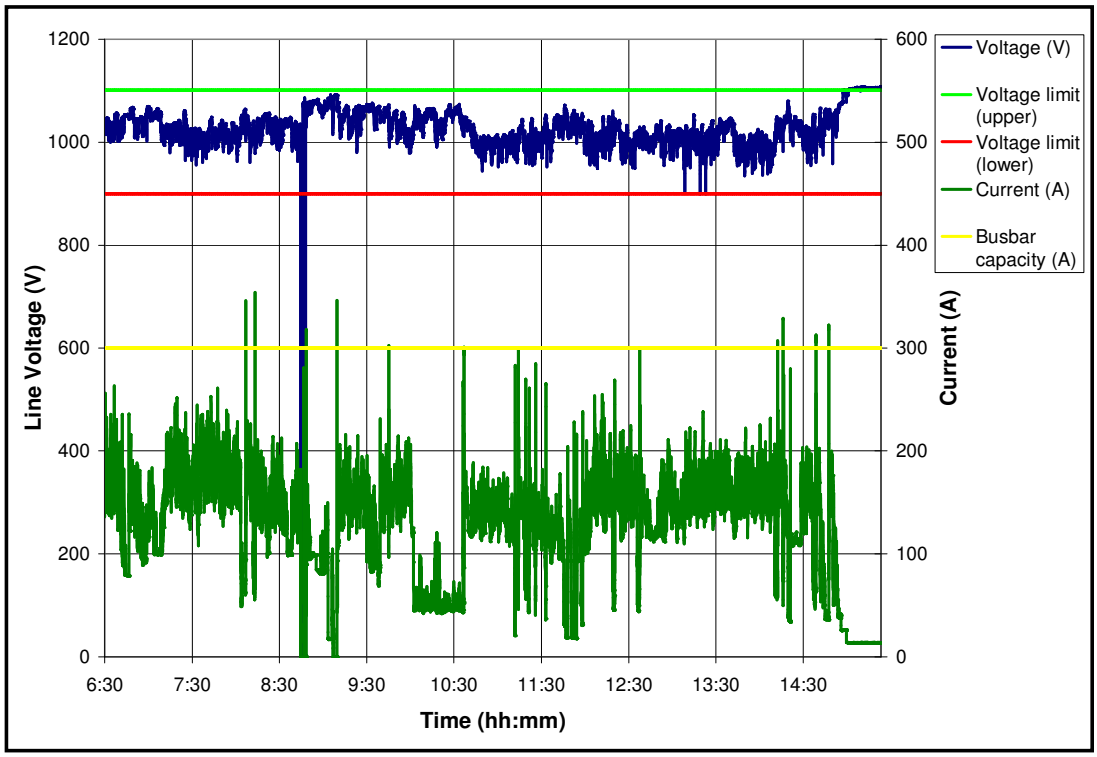

Figure D.1-13: Load current and voltage for a GEB – 23 May 2005.

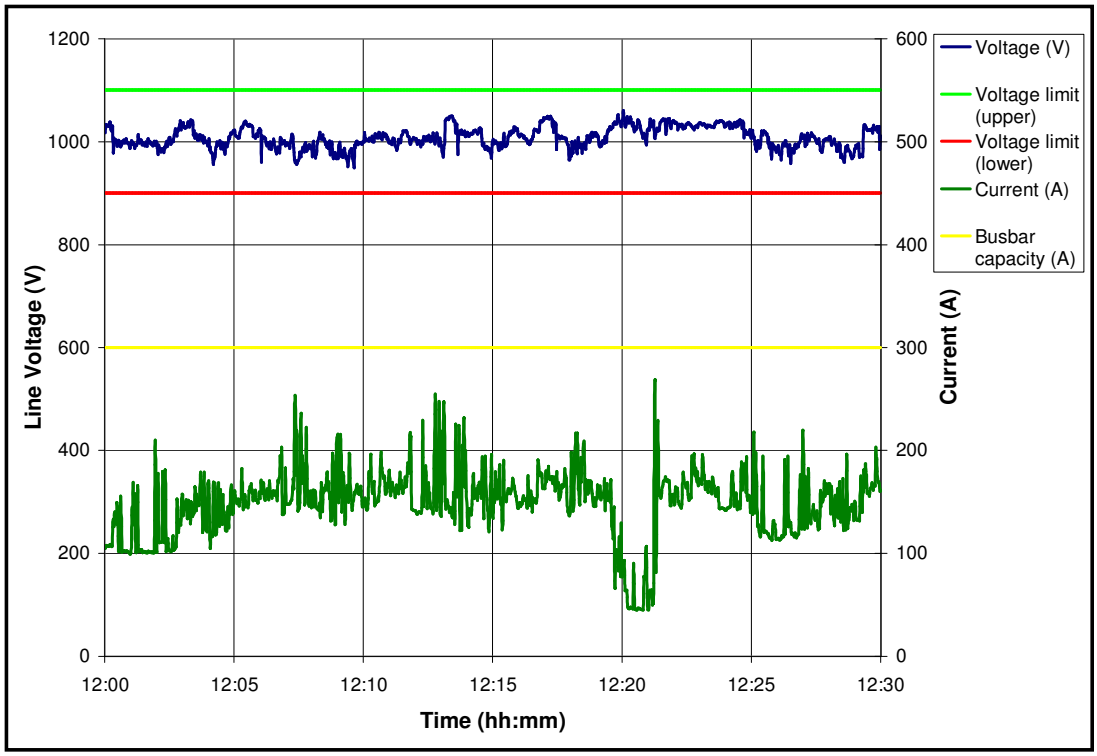

Figure D.1-14: Load current and voltage for a GEB – 23 May 2005 (30 minute period).

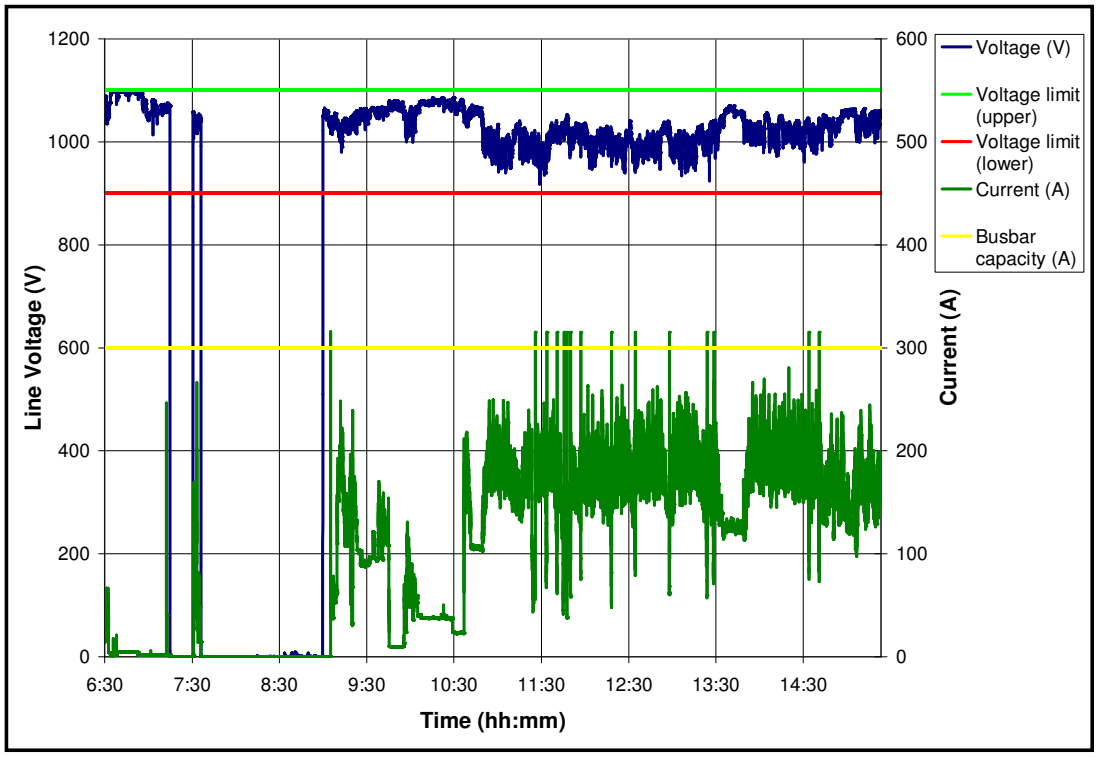

Figure D.1-15: Load current and voltage for a GEB – 24 May 2005.

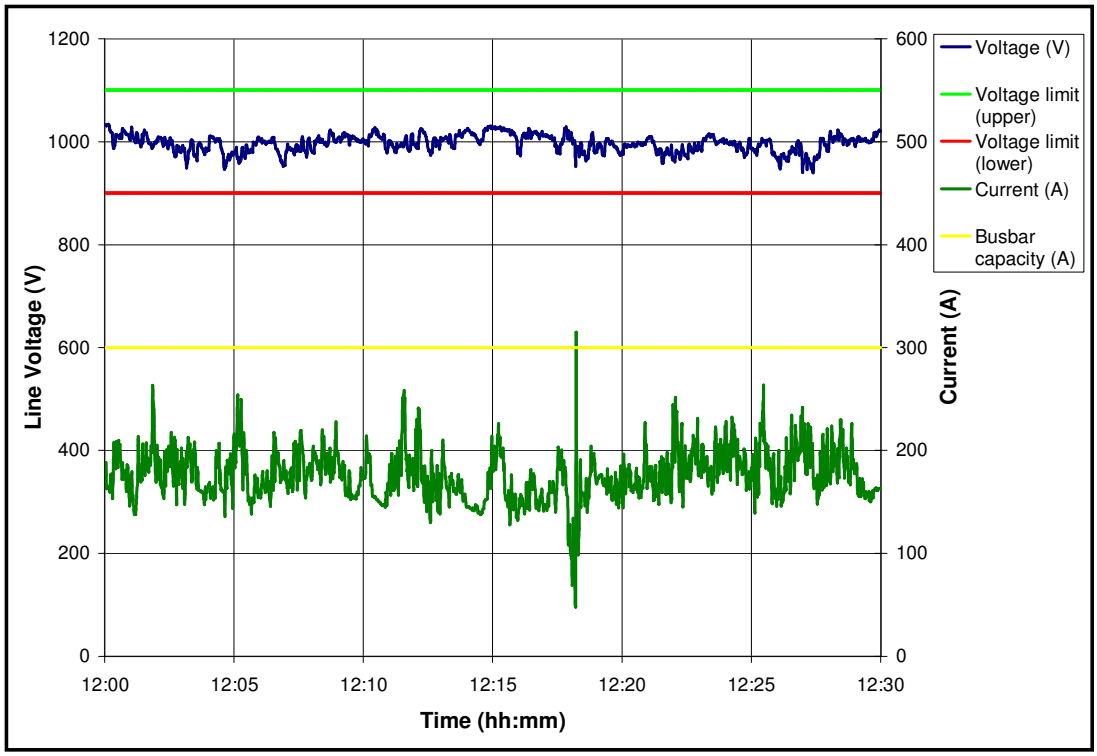

Figure D.1-16: Load current and voltage for a GEB – 24 May 2005 (30 minute period).

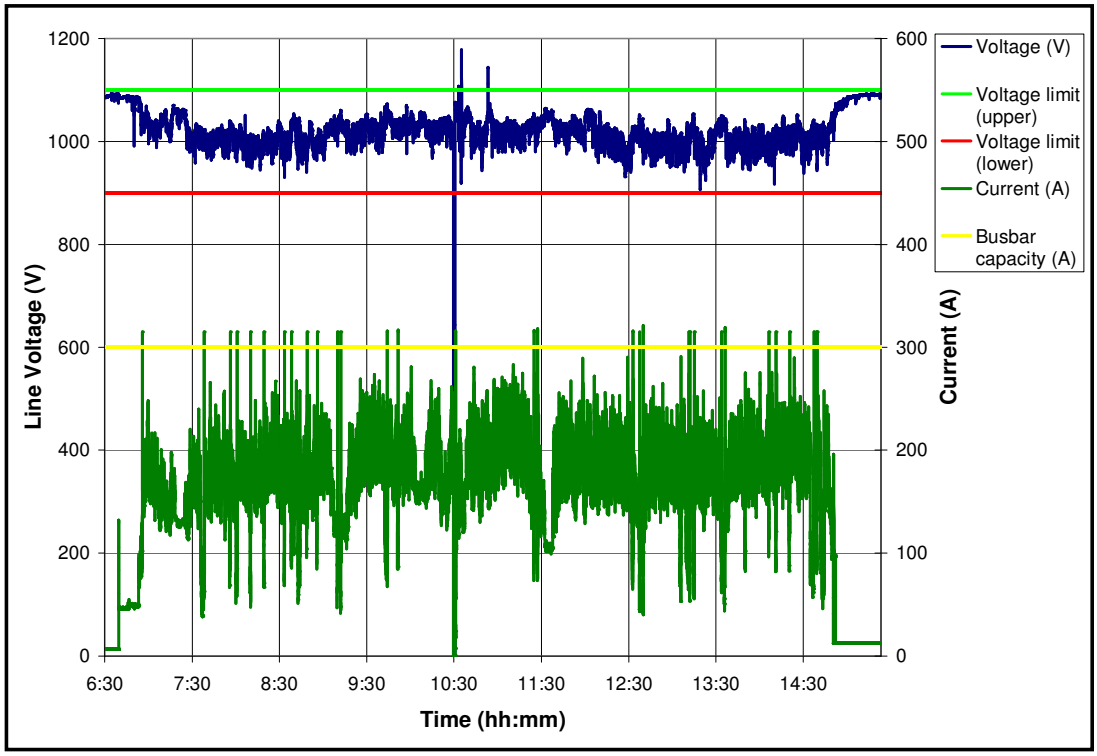

Figure D.1-17: Load current and voltage for a GEB – 25 May 2005.

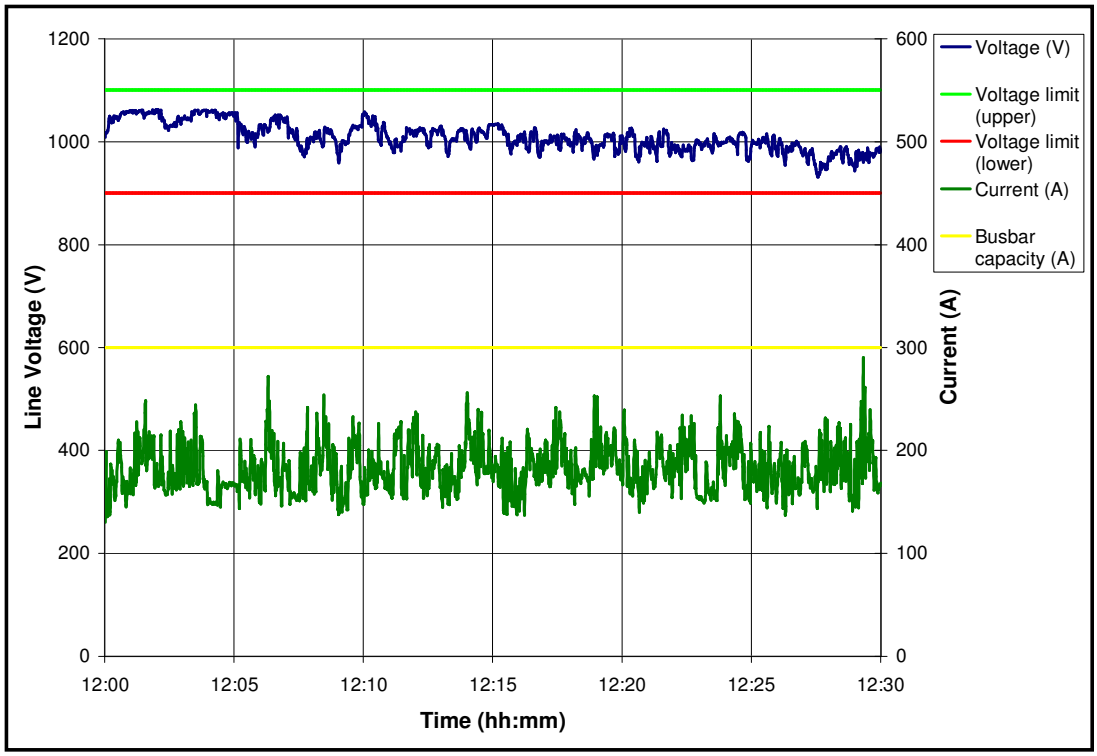

Figure D.1-18: Load current and voltage for a GEB – 25 May 2005 (30 minute period).

D.1.2.2 Afternoon shifts

Table D-5: Reasons for breakdowns and absent data.

Date	Time start	Time stop	Reason for breakdown or no data
23-May-2005	22:00	EOS	No current data - recorder stopped recording.
	23:04	EOS	No voltage data - recorder stopped recording.
24-May-2005	21:00	EOS	No current data - recorder stopped recording.
	23:30	EOS	No voltage data - recorder stopped recording.
25-May-2005	19:20	20:45	Conveyor belt torn - 15 m.
	21:10	EOS	Conveyor belt torn - 50 m.
	18:30	EOS	No current data - recorder stopped recording.
	22:59	EOS	No voltage data - recorder stopped recording.

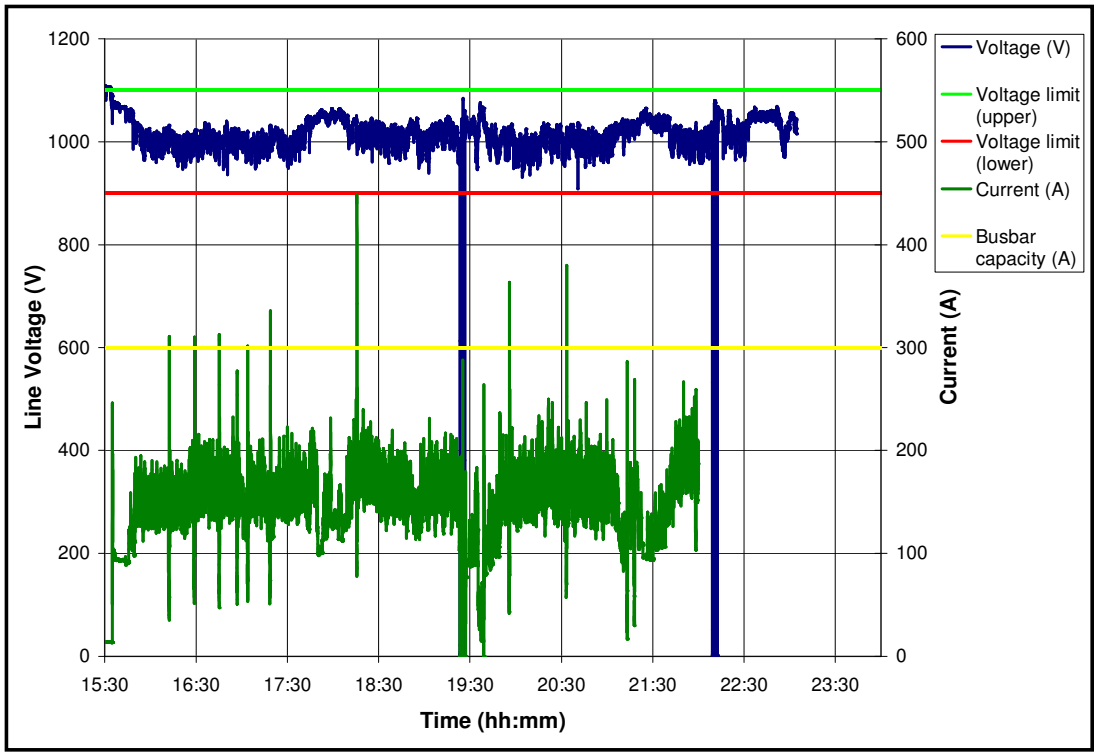

Figure D.1-19: Load current and voltage for a GEB – 23 May 2005.

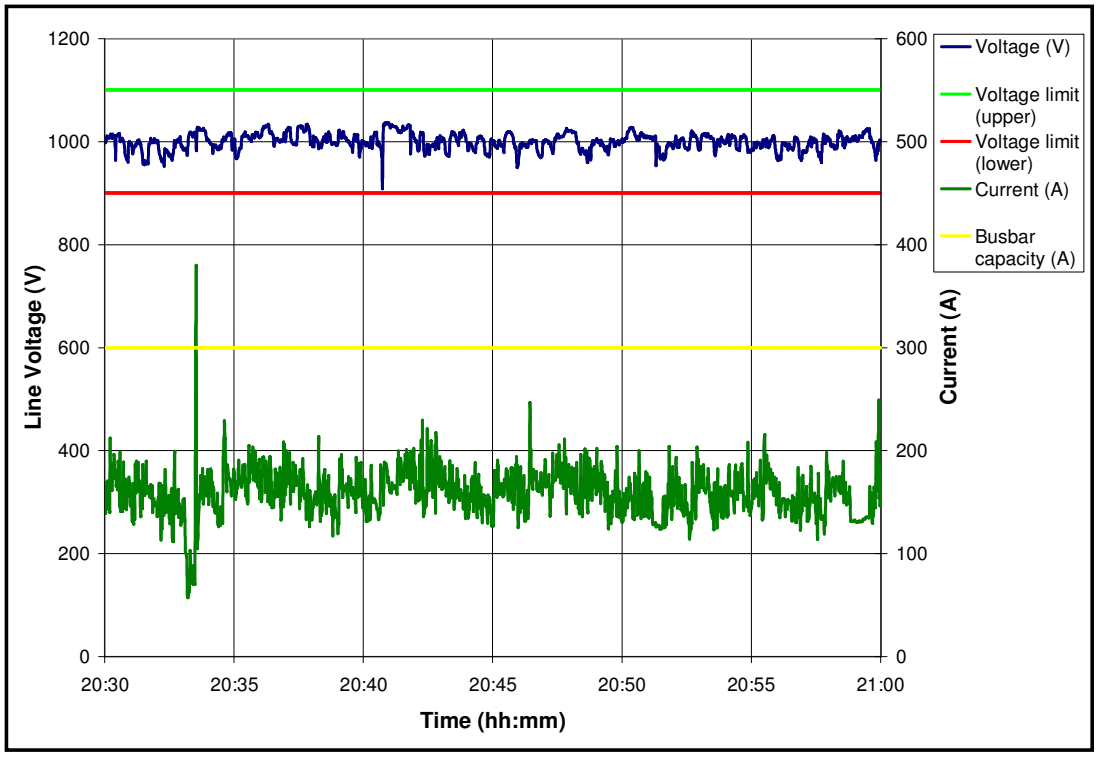

Figure D.1-20: Load current and voltage for a GEB – 23 May 2005 (30 minute period).

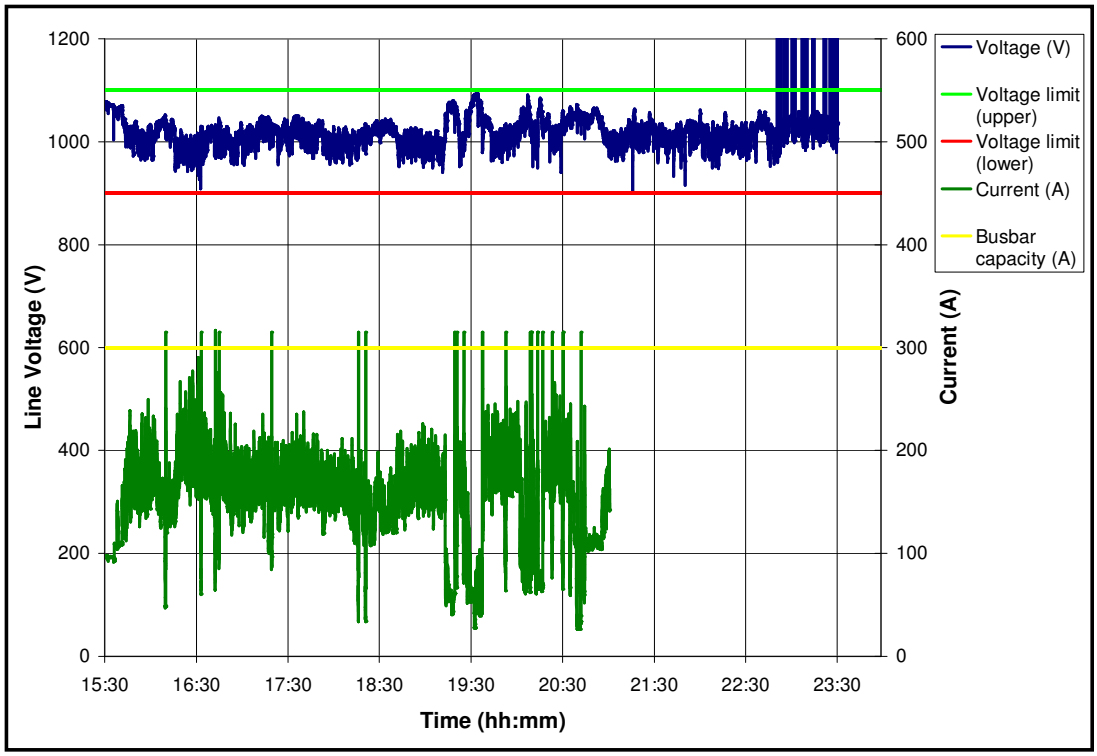

Figure D.1-21: Load current and voltage for a GEB – 24 May 2005.

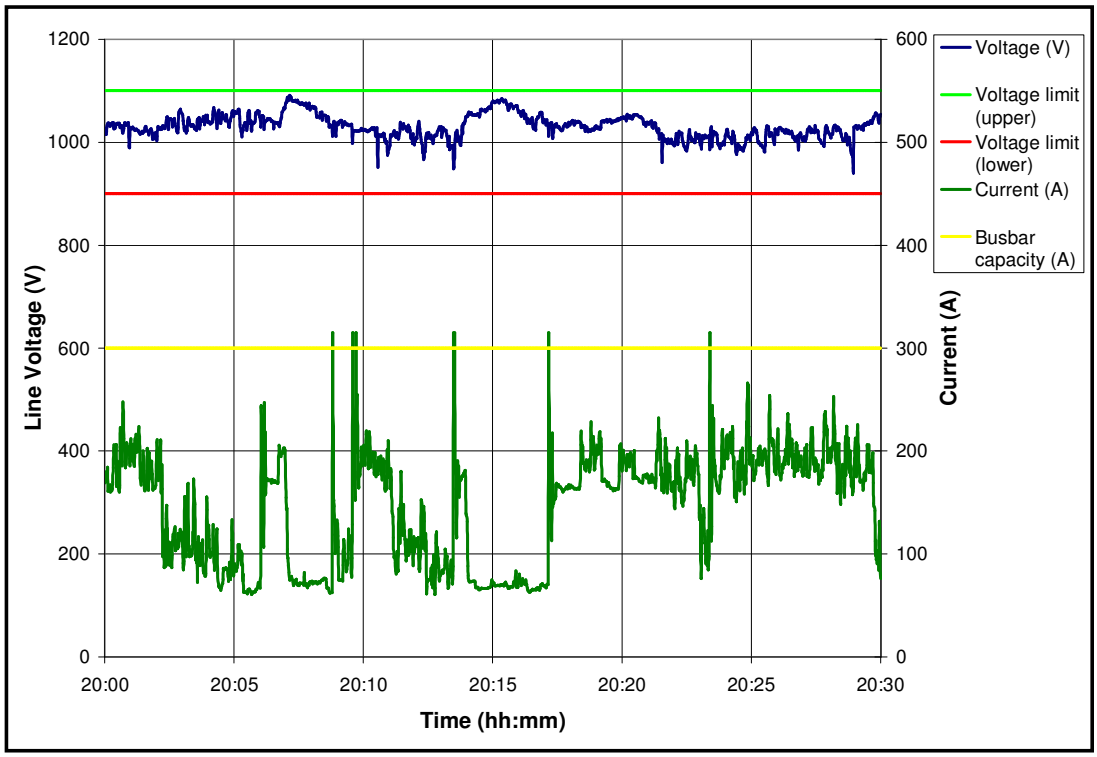

Figure D.1-22: Load current and voltage for a GEB – 24 May 2005 (30 minute period).

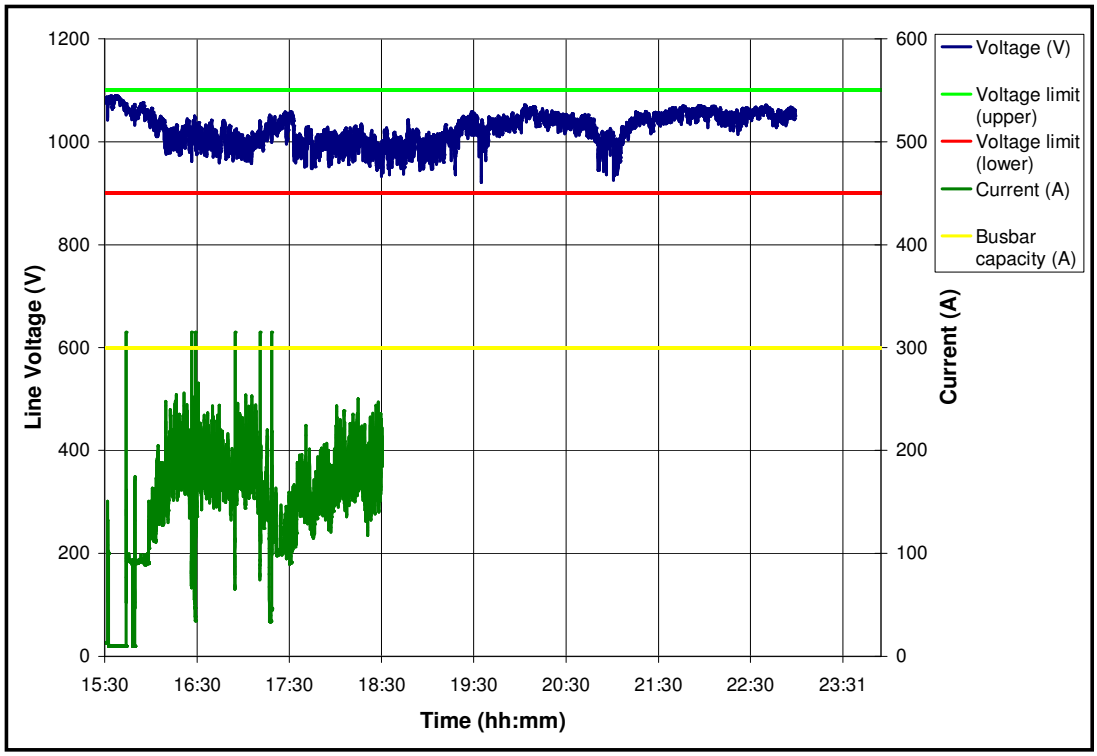

Figure D.1-23: Load current and voltage for a GEB – 25 May 2005.

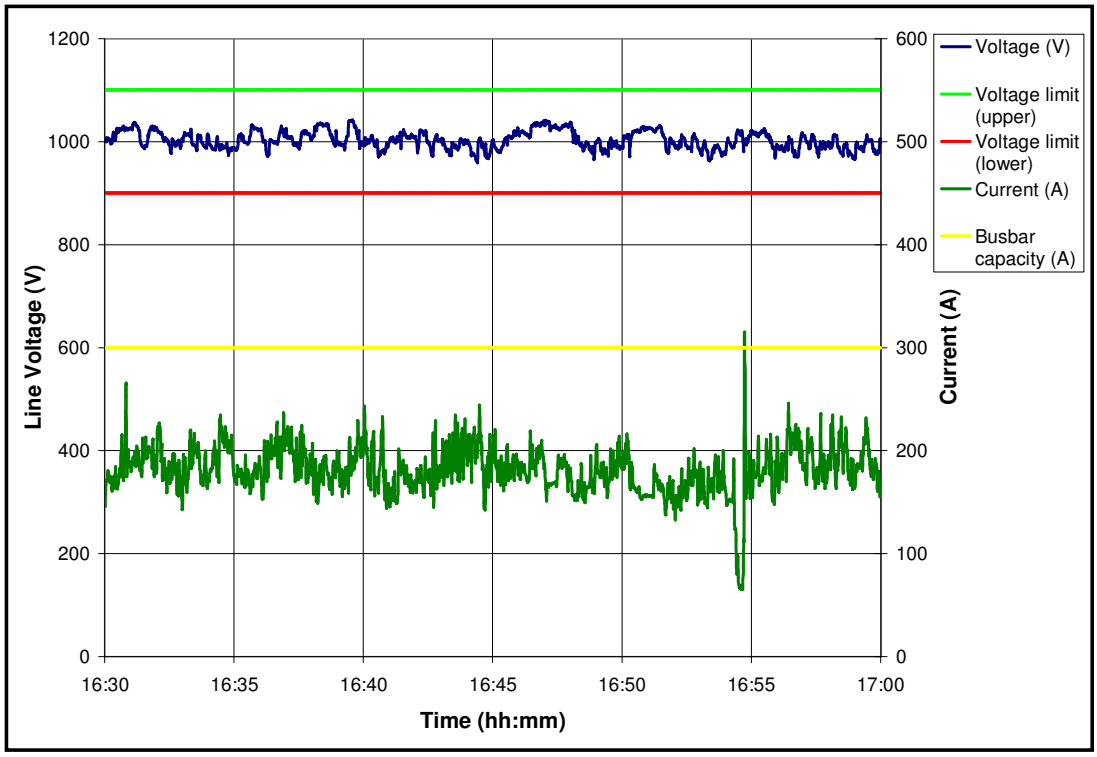

Figure D.1-24: Load current and voltage for a GEB – 25 May 2005 (30 minute period).

D.2 HISTOGRAM

The next section focuses on the frequency with which a Gate end box consumed a certain load current. The graphs show the number of times a certain current has been consumed. The tables give data about the tonnes produced during the shift and the percentage time of the shift that power were consumed. The time that the busbar have been over loaded or loaded within capacity are given as a percentage of the actual producing time. The morning shifts and afternoon shifts are separated as well as the measurements made at the different sections.

D.2.1 SECTION 21

D.2.1.1 Morning shifts

Table D-6: Data for the total consumption of a GEB in section 21.

	17-May-05	18-May-05	19-May-05
Tonnes/CM/Shift	858	1320	1716
% Time of shift producing	52.99%	85.17%	84.11%
% of Production time underloaded	100.00%	100.00%	100.00%
% of Production time overloaded	0.00%	0.00%	0.00%

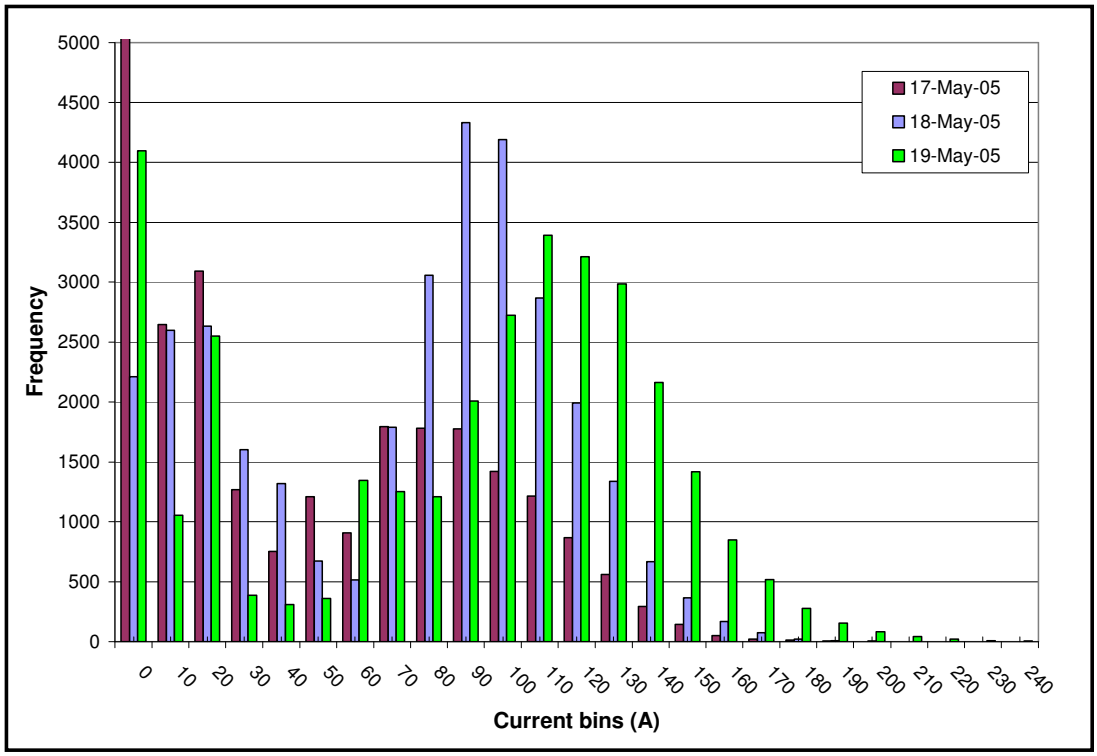

Figure D.2-1: Histogram for current consumed by a GEB.

D.2.1.2 Afternoon shifts

Table D-7: Data for the total consumption of a GEB in section 21.

	17-May-05	18-May-05	19-May-05
Tonnes/CM/Shift	2145	2112	2013
% Time of shift producing	97.12%	98.72%	100.00%
% of Production time underloaded	100.00%	100.00%	100.00%
% of Production time overloaded	0.00%	0.00%	0.00%

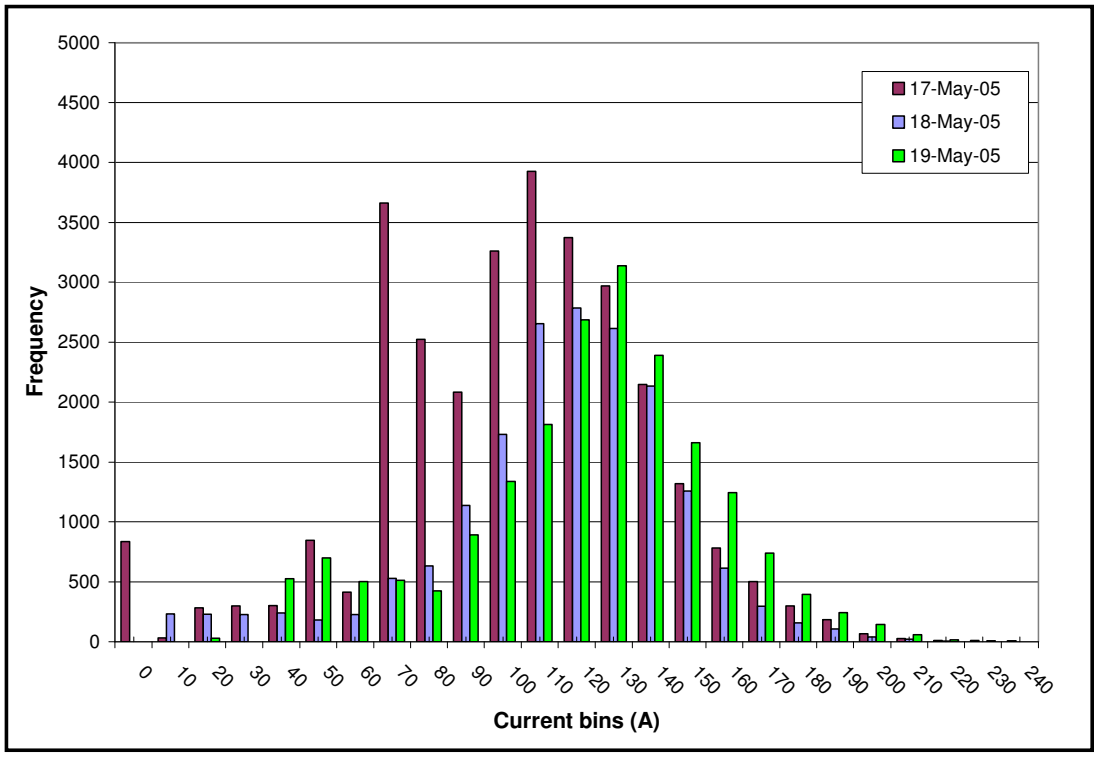

Figure D.2-2: Histogram for current consumed by a GEB.

D.2.2 SECTION 61

D.2.2.1 Morning shifts

Table D-8: Data for the total consumption of a GEB in section 61.

	23-May-05	24-May-05	25-May-05
Tonnes/CM/Shift	1740	1450	2320
% Time of shift producing	98.95%	72.12%	98.00%
% of Production time underloaded	99.97%	99.87%	99.83%
% of Production time overloaded	0.03%	0.13%	0.17%

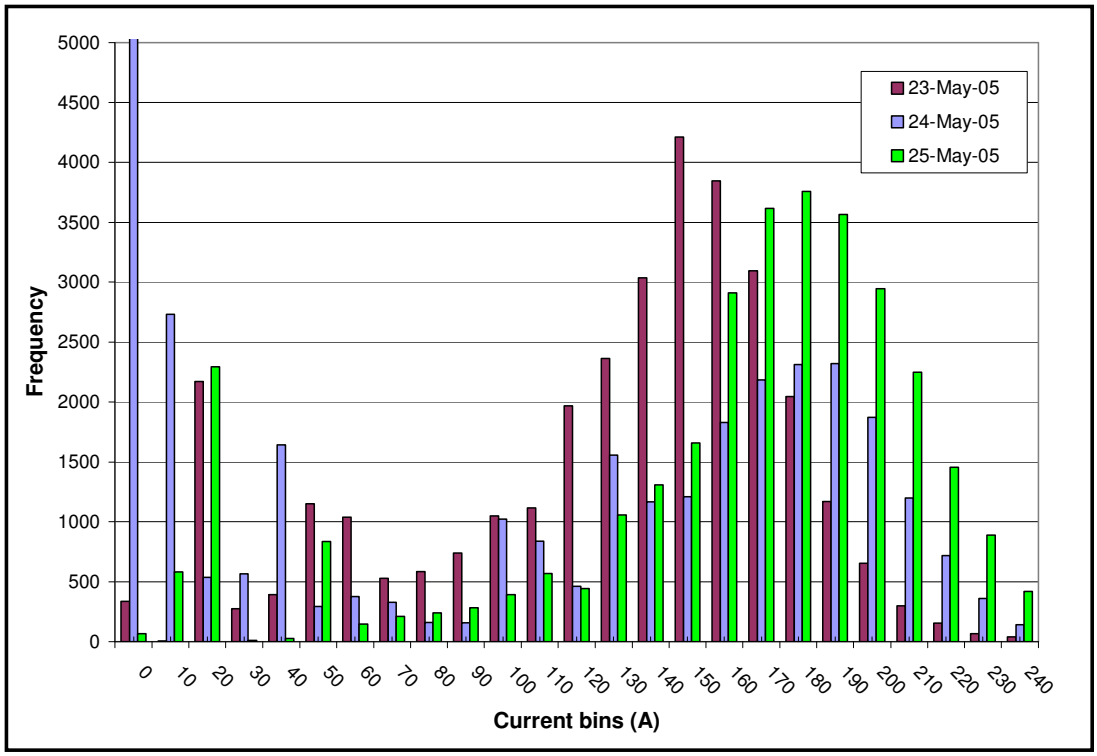

Figure D.2-3: Histogram for current consumed by a GEB.

D.2.2.2 Afternoon shifts

Table D-9: Data for the total consumption of a GEB in section 61.

	23-May-05	24-May-05	25-May-05
Tonnes/CM/Shift	2030	2320	1160
% Time of shift producing	99.14%	100.00%	97.03%
% of Production time underloaded	99.96%	99.79%	99.89%
% of Production time overloaded	0.04%	0.21%	0.11%

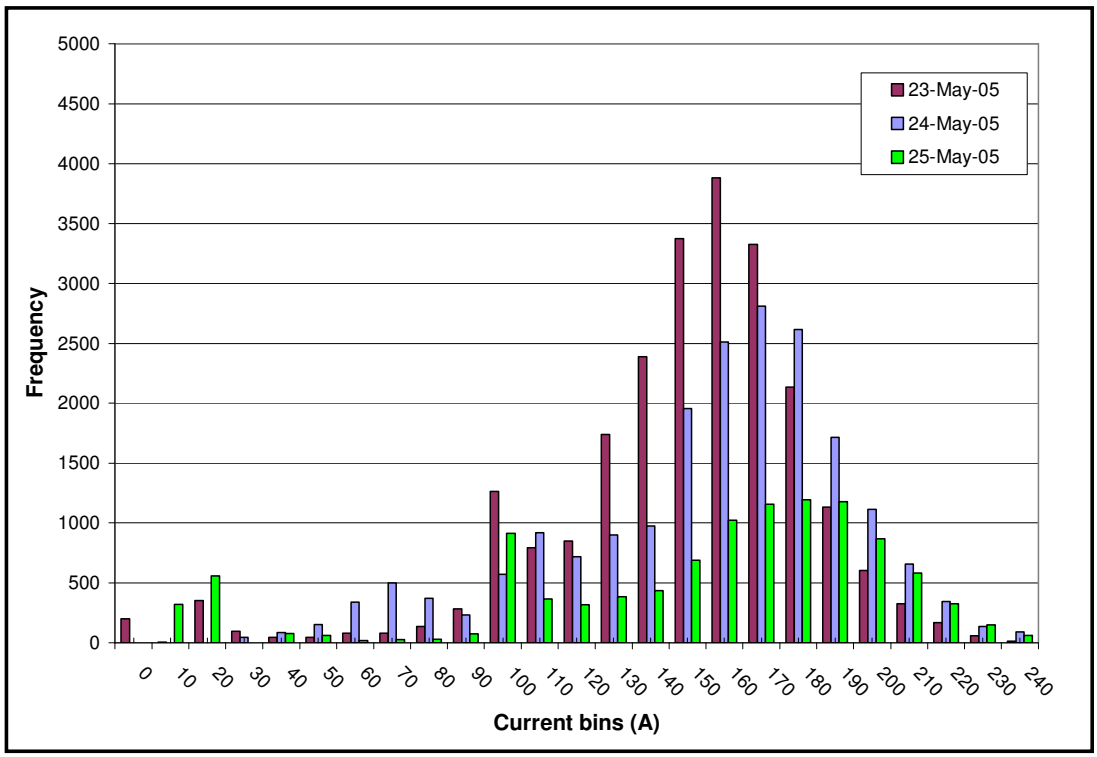

Figure D.2-4: Histogram for current consumed by a GEB.