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APPENDIX Q

FEEDER BREAKER CONVEYOR MOTOR

Typical nameplate data for the conveyor motor of a Feeder breaker can be seen in Table Q-1. The conveyor motor measured at both sections was a 55 kW induction motor with a full load current rating of 39 A.

Table Q-1: Nameplate data of the conveyor motor on a Feeder breaker.

Feeder breaker Conveyor Motor				
Power	55	kW	Voltage	1000 V
Duty	S1		Current	39 A
Ins class	H		RPM	1475
			pf	0.87

Table Q-2: Production figures for shifts that the conveyor motor was investigated.

Date	Sect 21		Sect 51	
	Morning	Afternoon	Morning	Afternoon
31-May-2005	1782	1716	-	-
1-Jun-2005	1254	1980	-	-
2-Jun-2005	1320	2145	-	-
28-Jun-2005	-	-	2204	1740

Q.1 LOAD PROFILE

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

Q.1.1 SECTION 21

Q.1.1.1 Morning shifts

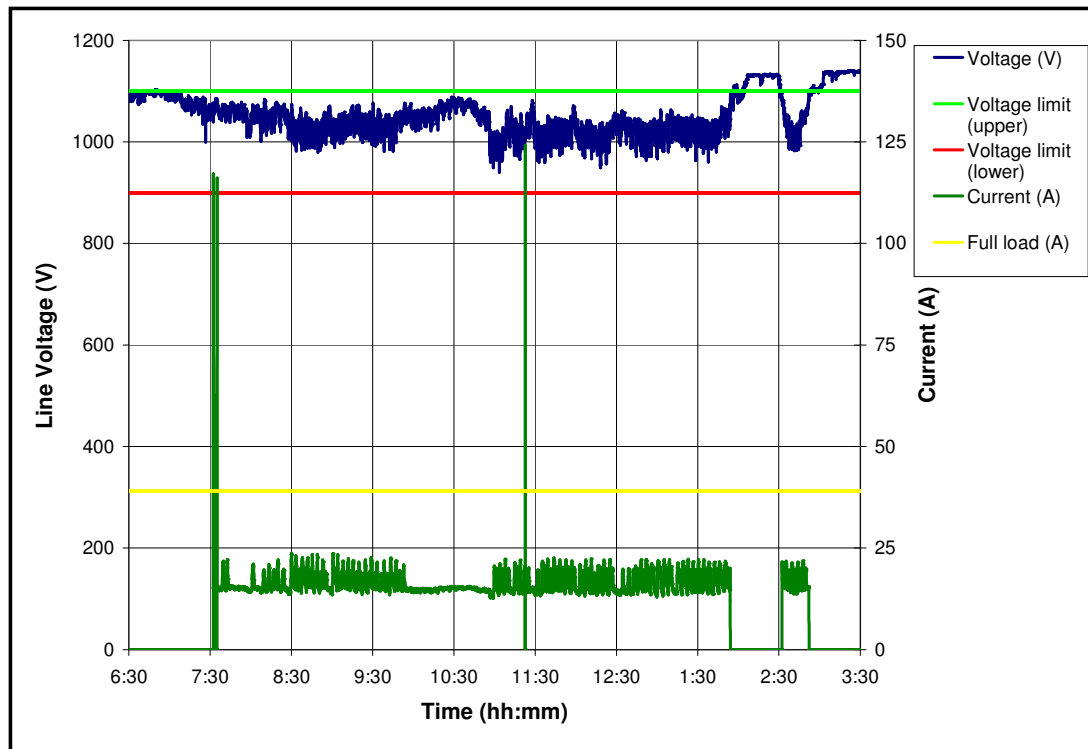
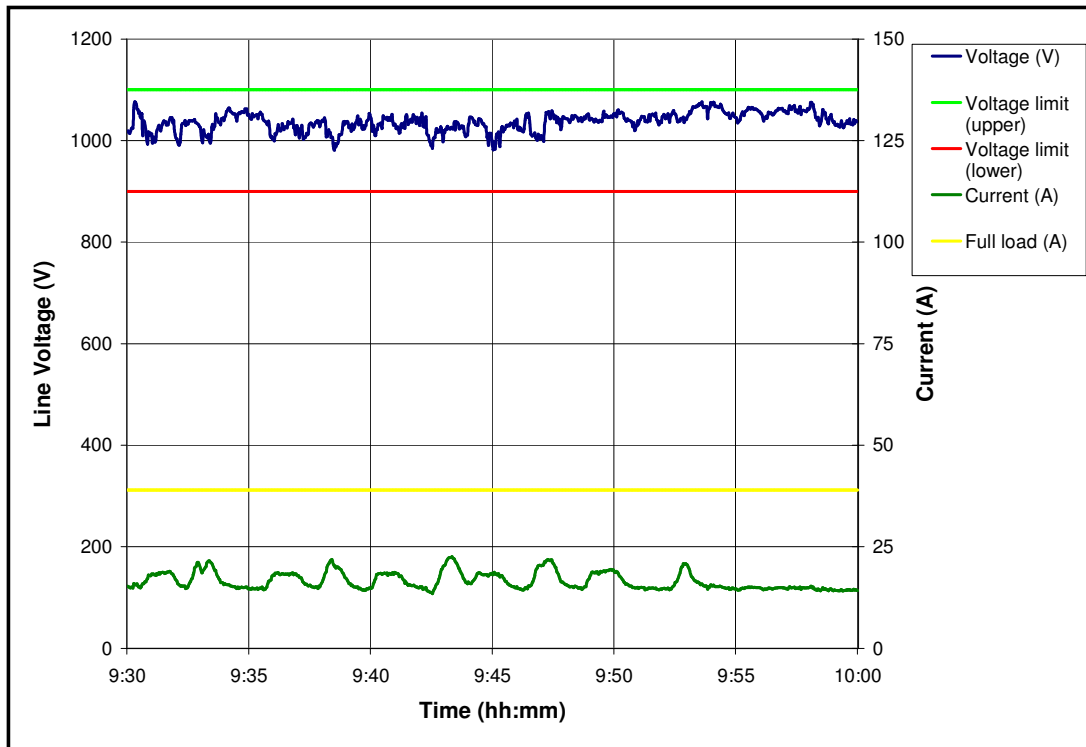


Figure Q.1-1: Load current and voltage for a conveyor motor – 31 May 2005.



**Figure Q.1-2: Load current and voltage for a conveyor motor
– 31 May 2005 (30 minute period).**

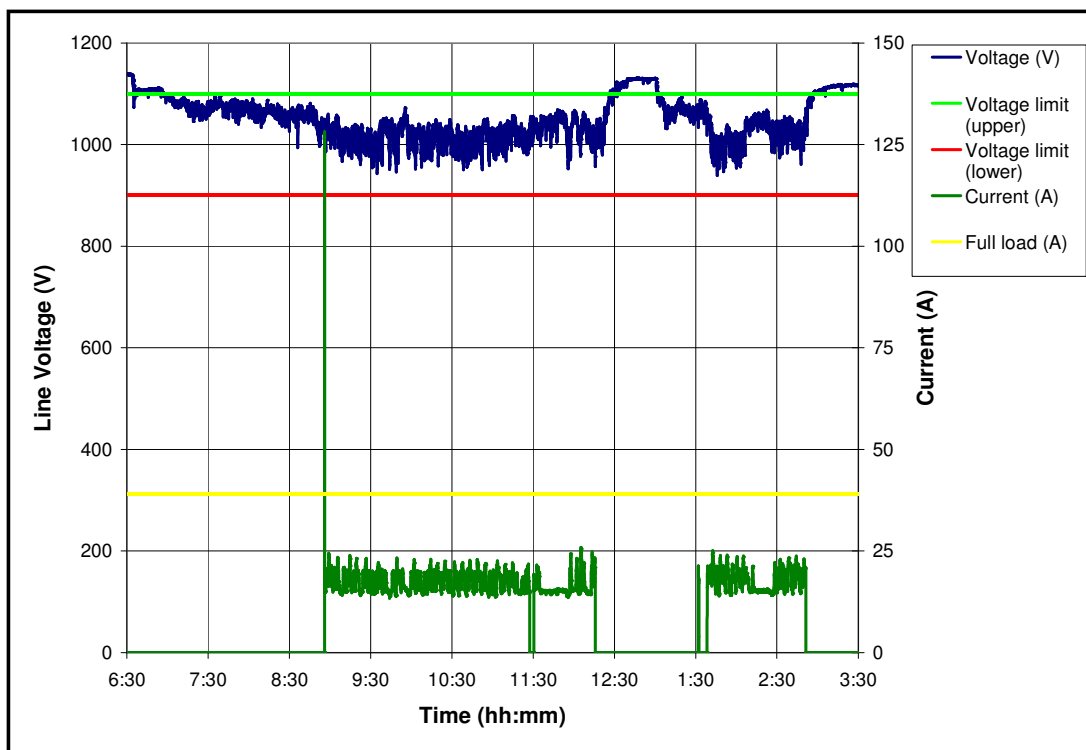
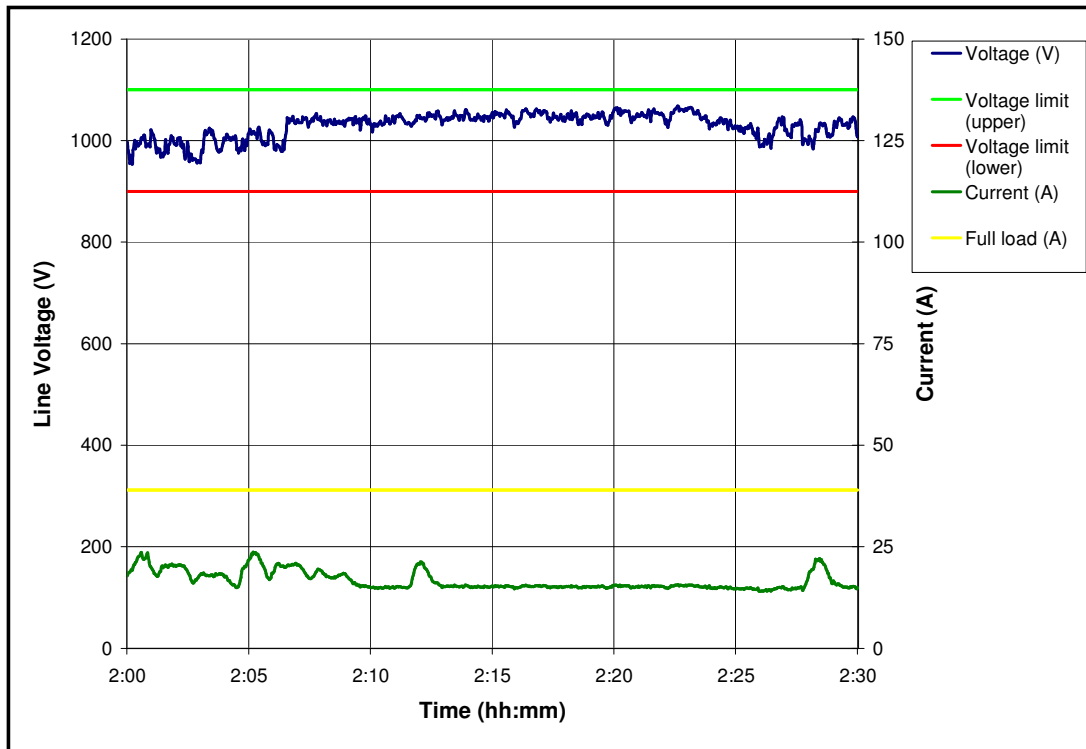


Figure Q.1-3: Load current and voltage for a conveyor motor – 01 June 2005.



**Figure Q.1-4: Load current and voltage for a conveyor motor
– 01 June 2005 (30 minute period).**

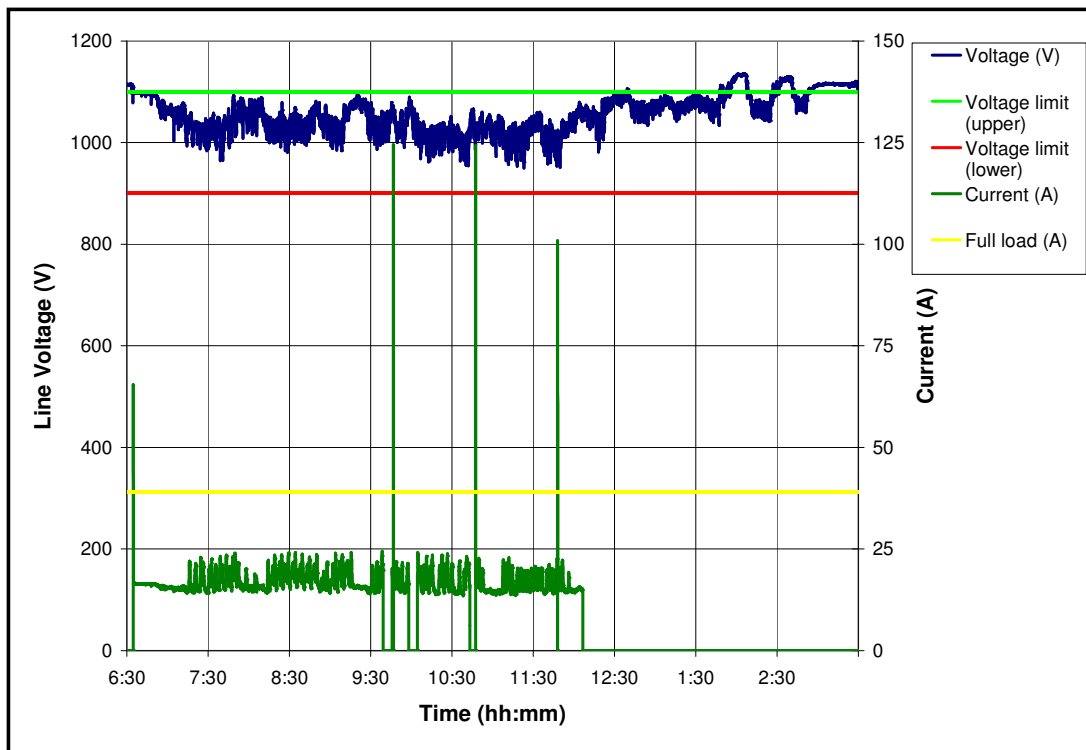
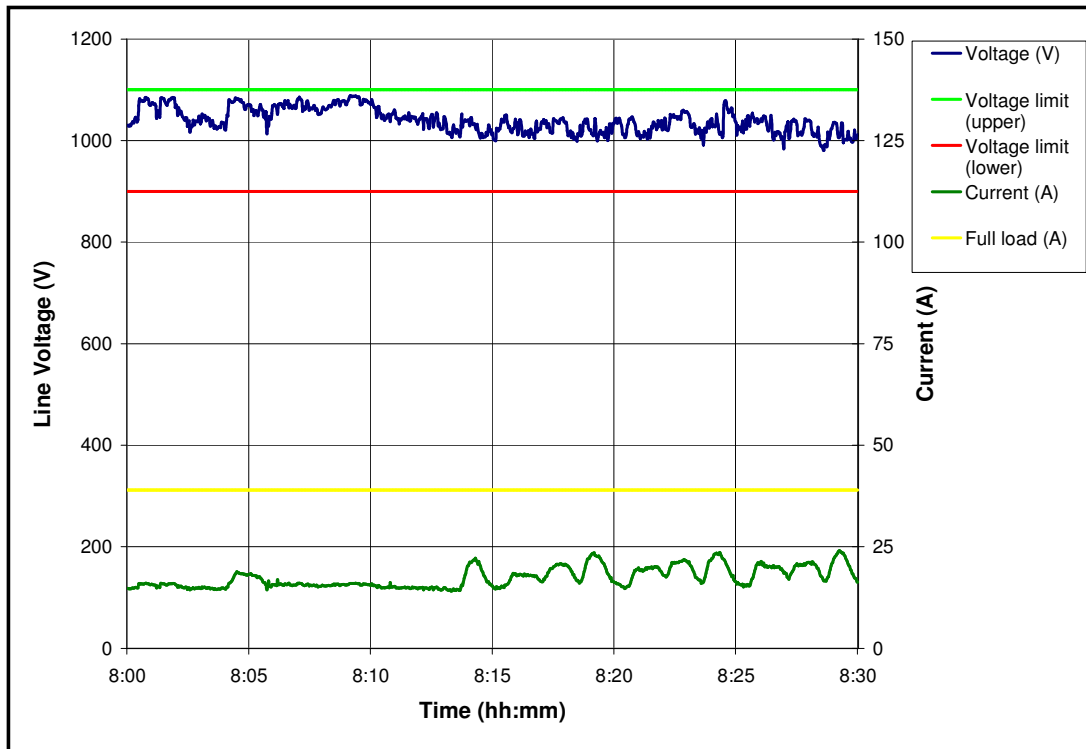


Figure Q.1-5: Load current and voltage for a conveyor motor – 02 June 2005.



**Figure Q.1-6: Load current and voltage for a conveyor motor
– 02 June 2005 (30 minute period).**

Q.1.1.2 Afternoon shifts

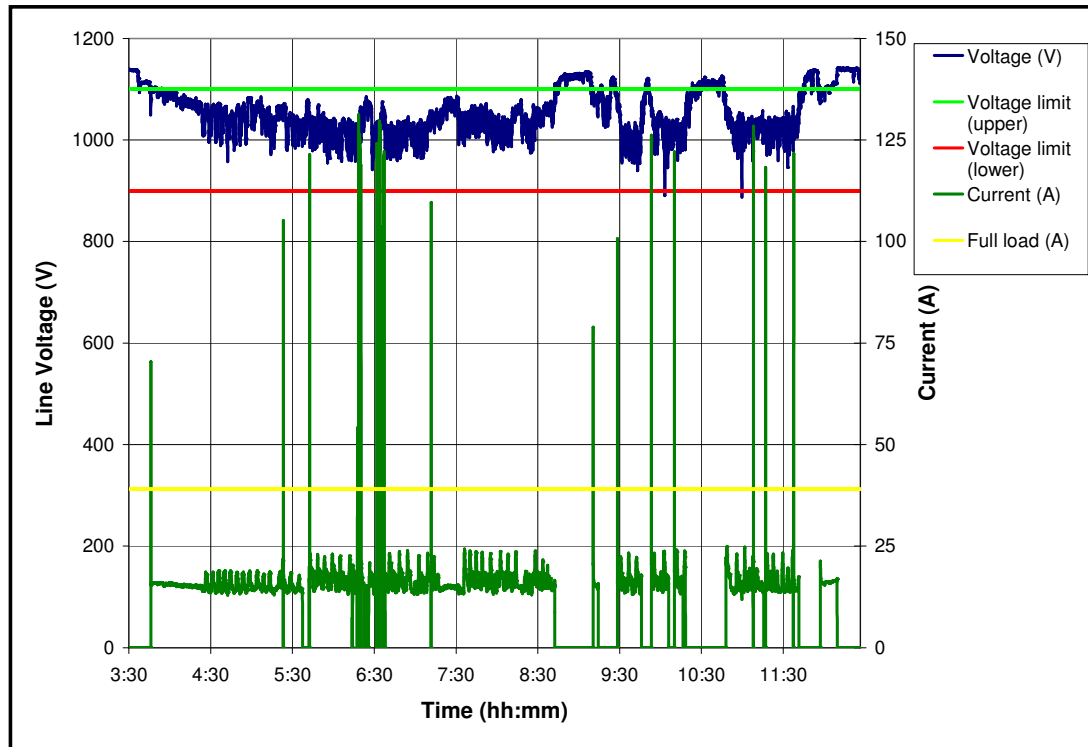
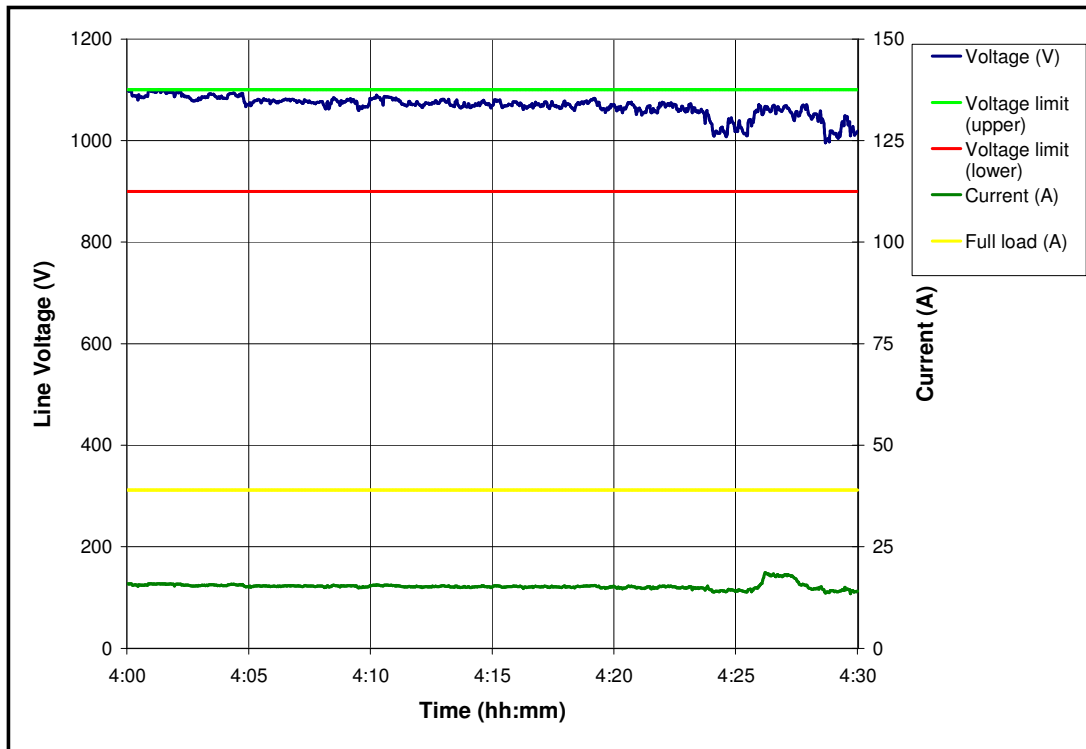


Figure Q.1-7: Load current and voltage for a conveyor motor – 31 May 2005.



**Figure Q.1-8: Load current and voltage for a conveyor motor
– 31 May 2005 (30 minute period).**

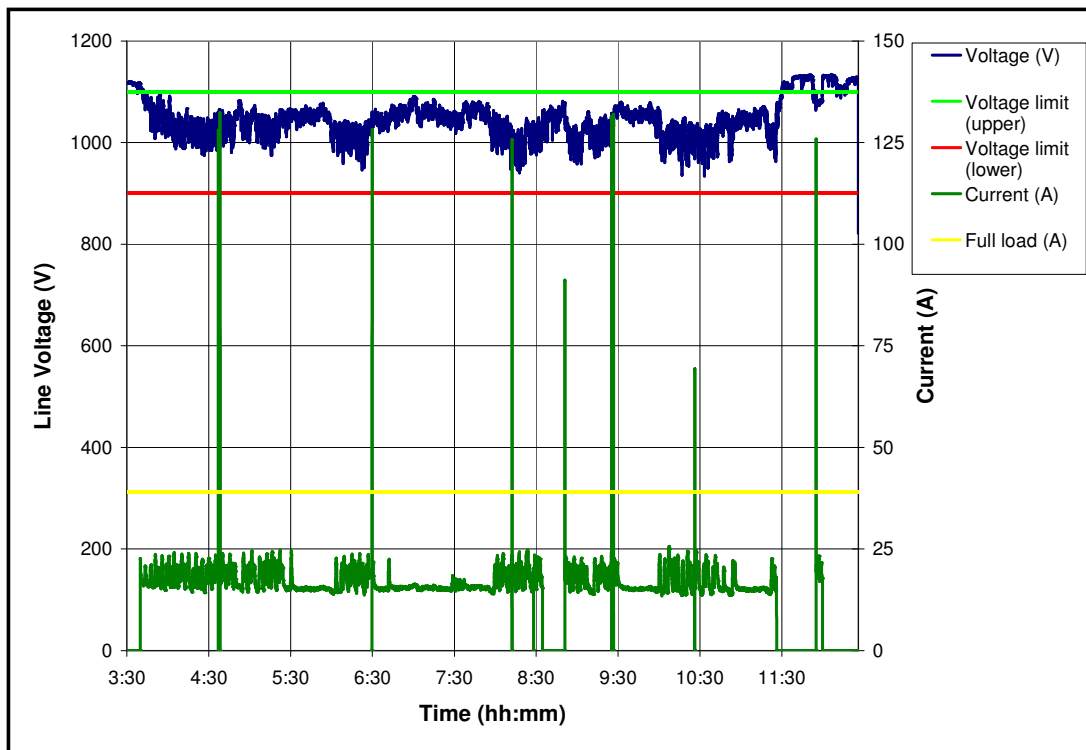
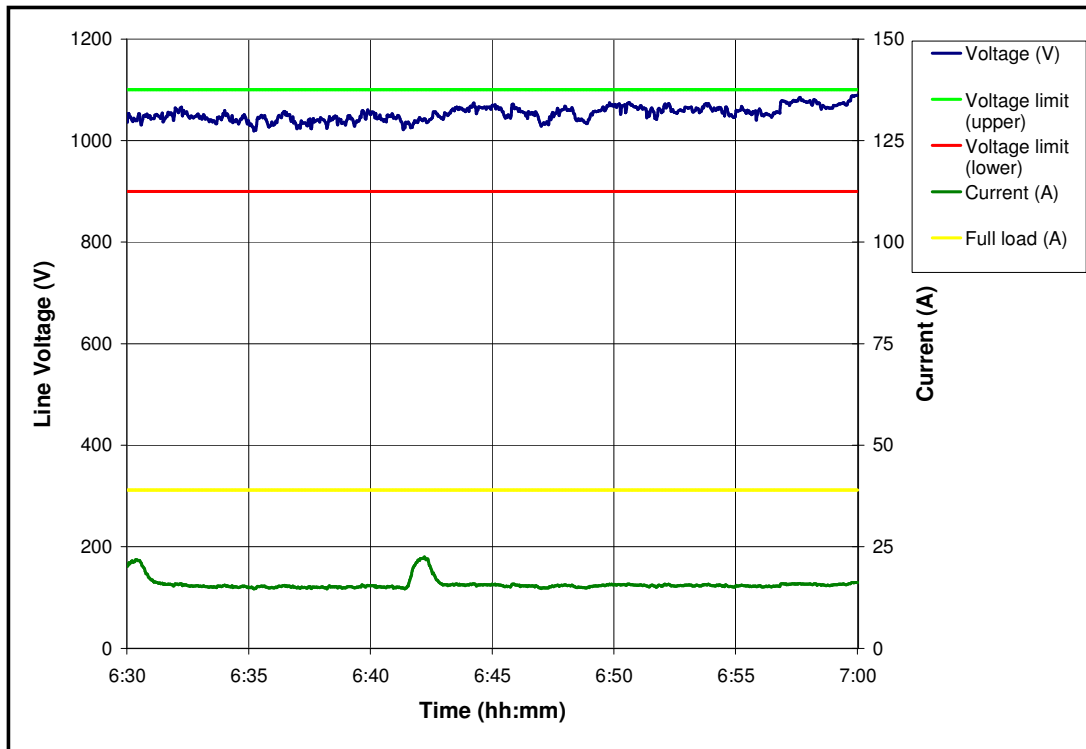


Figure Q.1-9: Load current and voltage for a conveyor motor – 01 June 2005.



**Figure Q.1-10: Load current and voltage for a conveyor motor
– 01 June 2005 (30 minute period).**

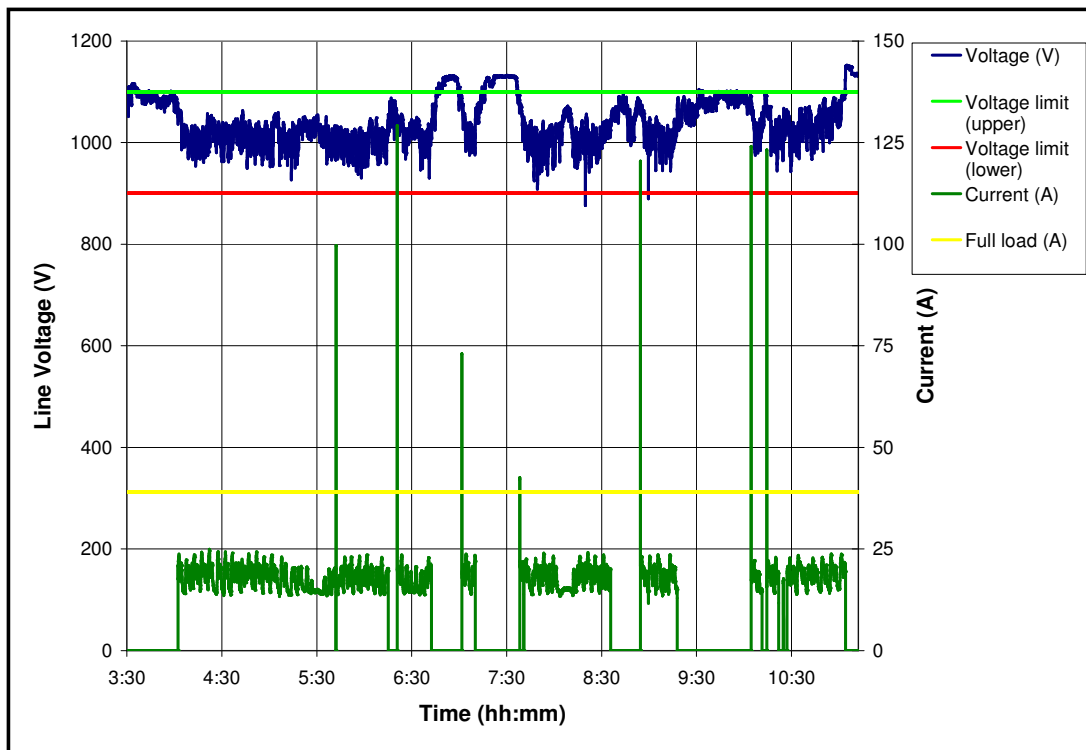
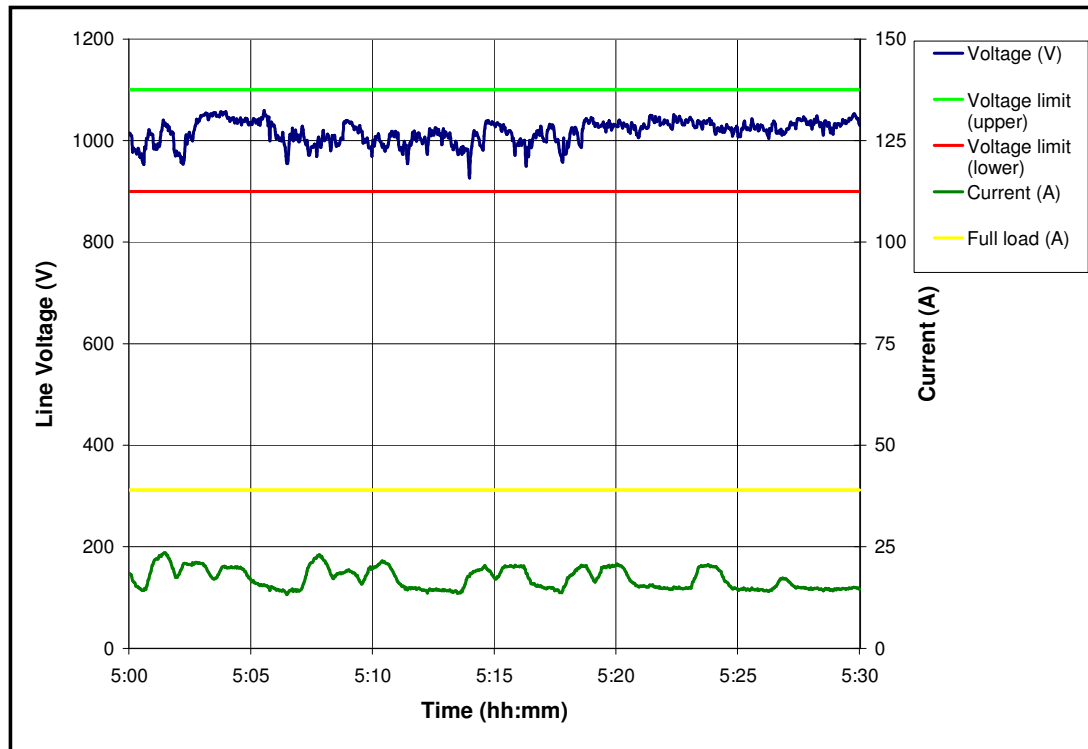


Figure Q.1-11: Load current and voltage for a conveyor motor – 02 June 2005.



**Figure Q.1-12: Load current and voltage for a conveyor motor
– 02 June 2005 (30 minute period).**

Q.1.2 SECTION 51

Q.1.2.1 Morning shifts

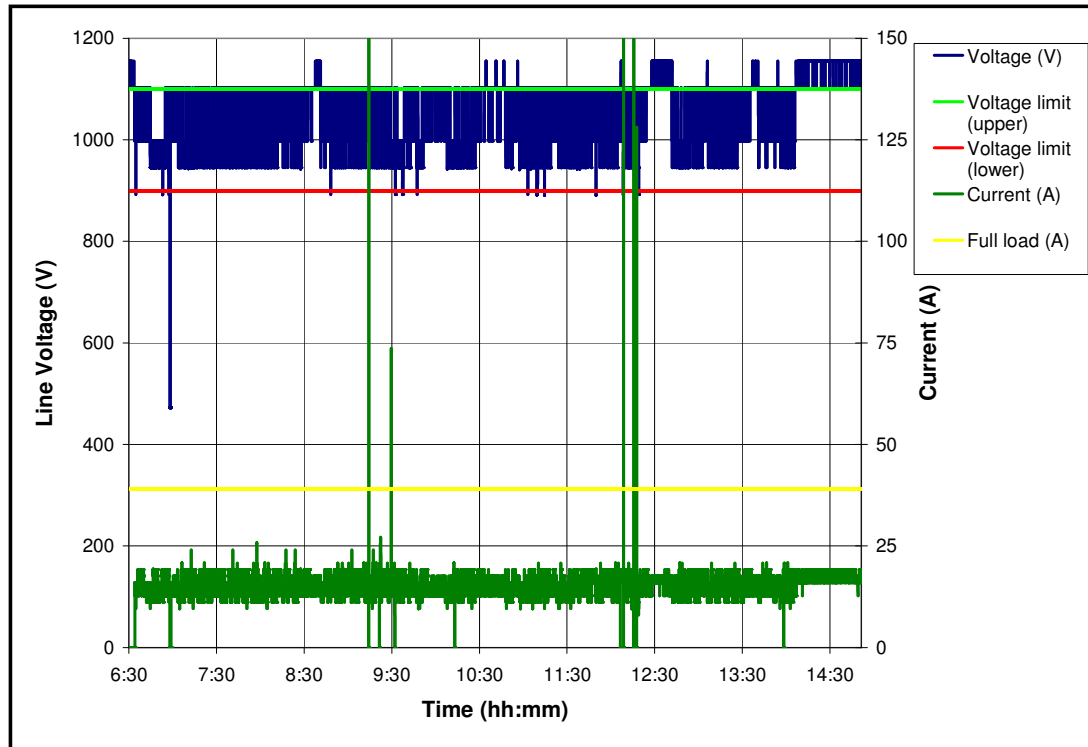
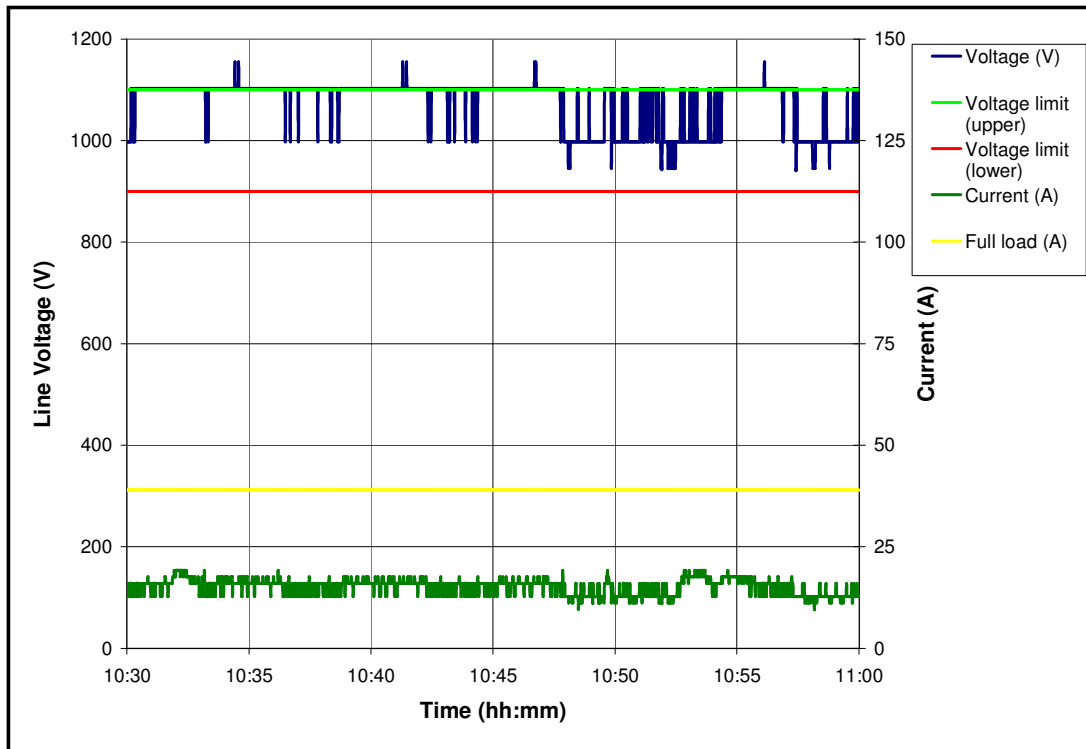


Figure Q.1-13: Load current and voltage for a conveyor motor – 28 June 2005.



**Figure Q.1-14: Load current and voltage for a conveyor motor
– 28 June 2005 (30 minute period).**

Q.1.2.2 Afternoon shifts

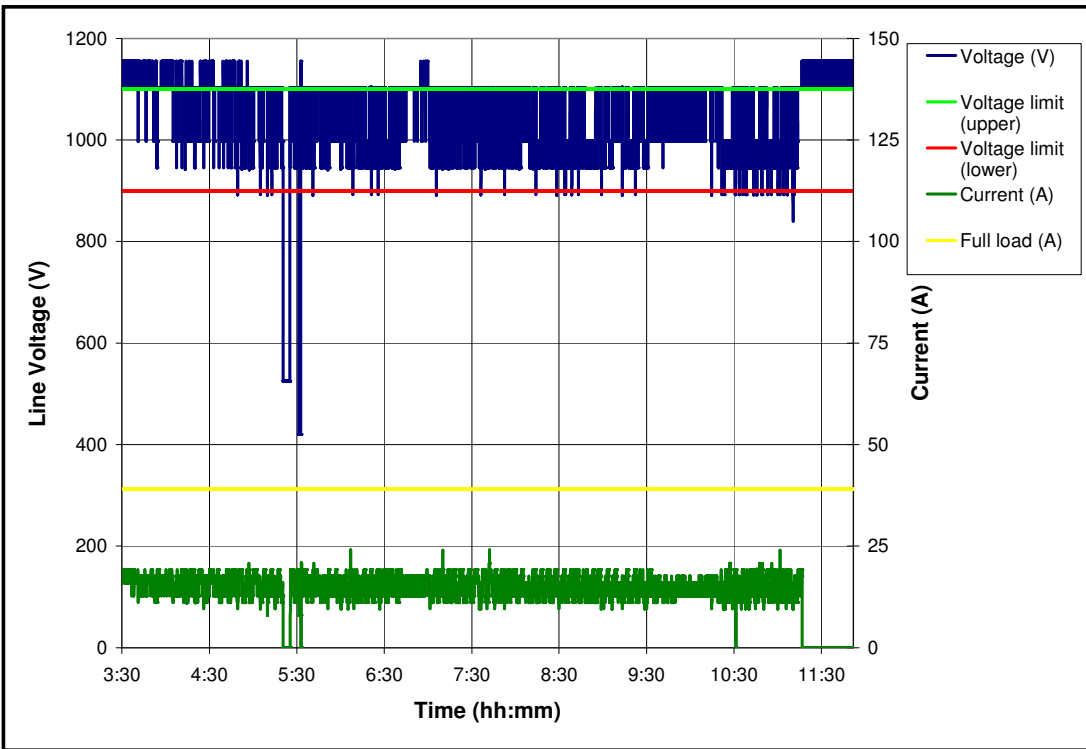
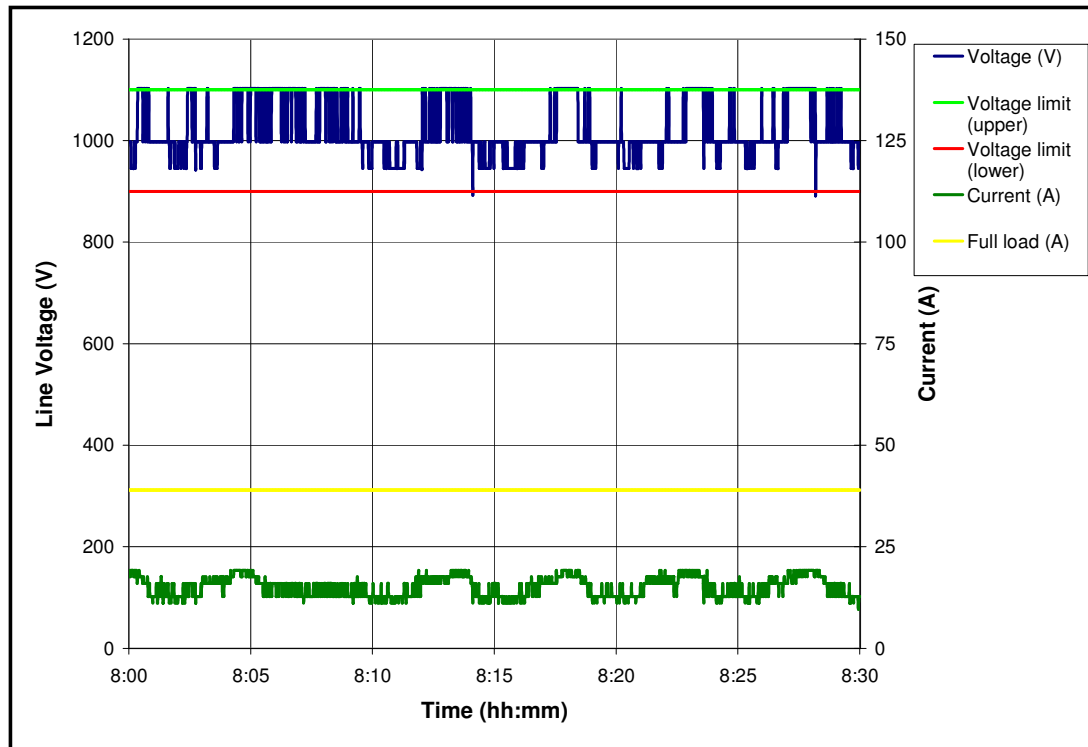


Figure Q.1-15: Load current and voltage for a conveyor motor – 28 June 2005.



**Figure Q.1-16: Load current and voltage for a conveyor motor
– 28 June 2005 (30 minute period).**

Q.2 HISTOGRAM

The next section focuses on the frequency with which a Feeder breakers conveyor motor consumed a certain load power and current. The graphs show the number of times a certain power or current has been consumed. The tables give data about the tonnes produced during the shift and the percentage time of the shift that the motors were producing. The time that the motors have been over loaded or loaded within the full load rating of the motor is 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.

Q.2.1 SECTION 21

Q.2.1.1 Morning shifts

Table Q-3: Data for the total consumption of a conveyor motor in section 21.

	31-May-05	1-Jun-05	2-Jun-05
Tonnes/CM/Shift	1782	1254	1320
% Time of shift producing	74.22%	50.08%	58.24%
% of Production time underloaded	100.00%	100.00%	100.00%
% of Production time overloaded	0.00%	0.00%	0.00%

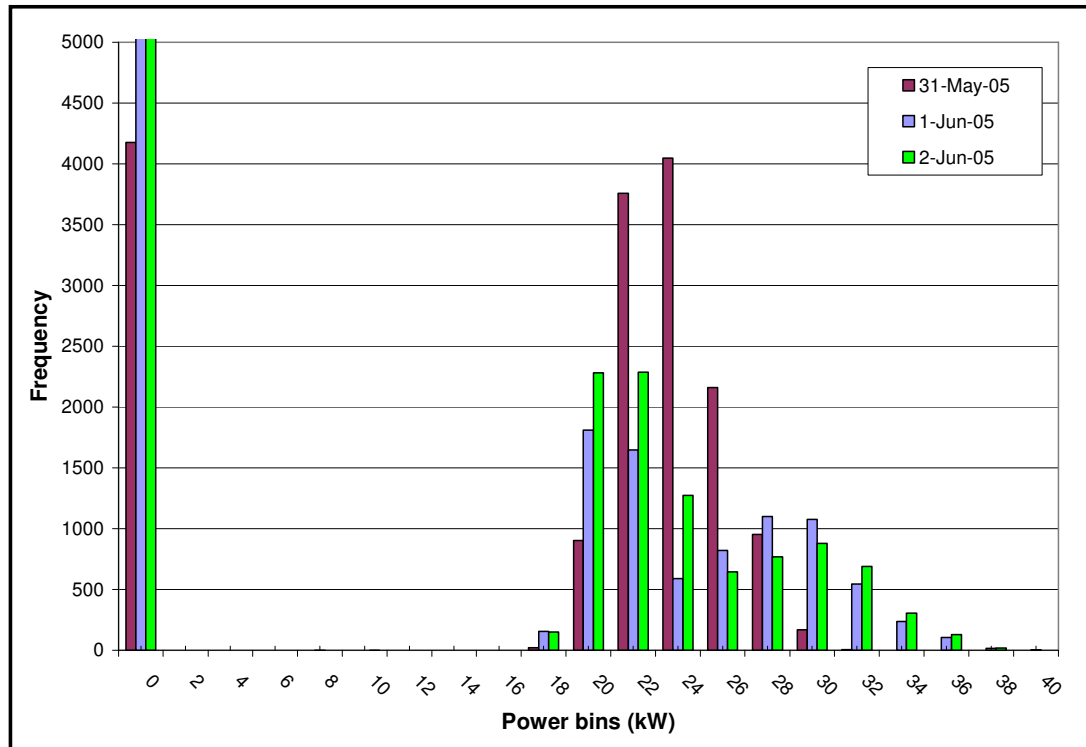


Figure Q.2-1: Histogram for power consumed by a conveyor motor.

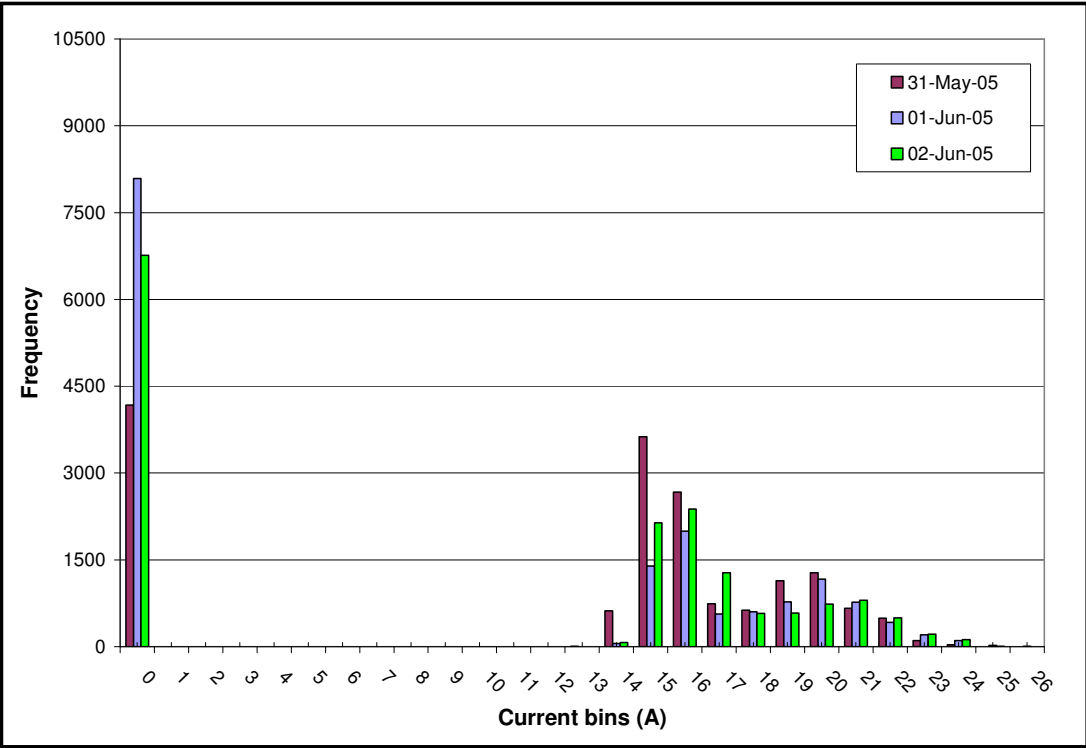


Figure Q.2-2: Histogram for current consumed by a conveyor motor.

Q.2.1.2 Afternoon shifts

Table Q-4: Data for the total consumption of a conveyor motor in section 21.

	31-May-05	01-Jun-05	02-Jun-05
Tonnes/CM/Shift	1716	1980	2145
% Time of shift producing	72.91%	84.52%	63.90%
% of Production time underloaded	100.00%	100.00%	100.00%
% of Production time overloaded	0.00%	0.00%	0.00%

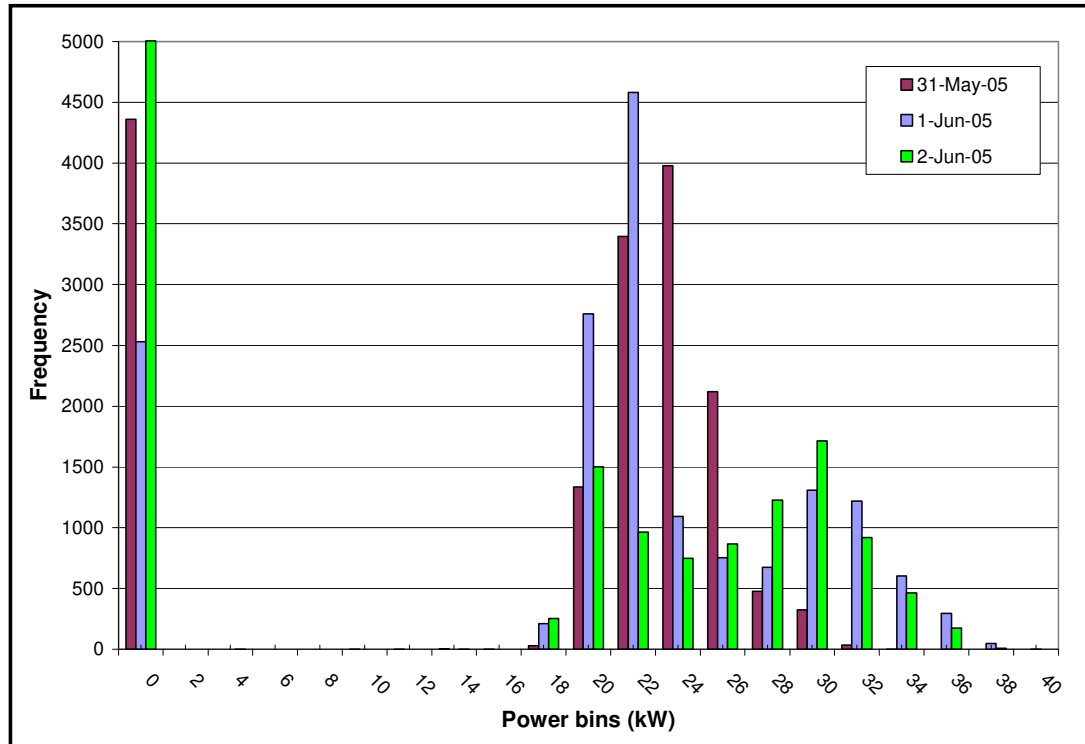


Figure Q.2-3: Histogram for power consumed by a conveyor motor.

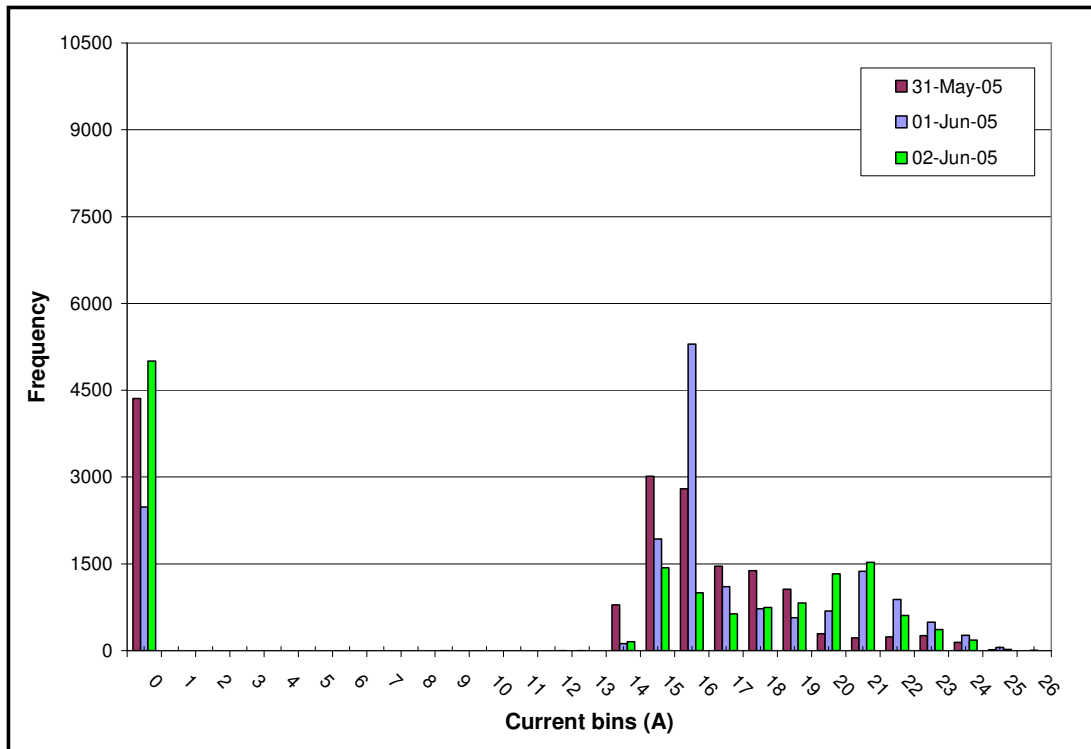


Figure Q.2-4: Histogram for current consumed by a conveyor motor.

Q.2.2 SECTION 51

Q.2.2.1 Morning shifts

Table Q-5: Data for the total consumption of a conveyor motor in section 51.

	28-Jun-05
Tonnes/CM/Shift	2204
% Time of shift producing	98.32%
% of Production time underloaded	100.00%
% of Production time overloaded	0.00%

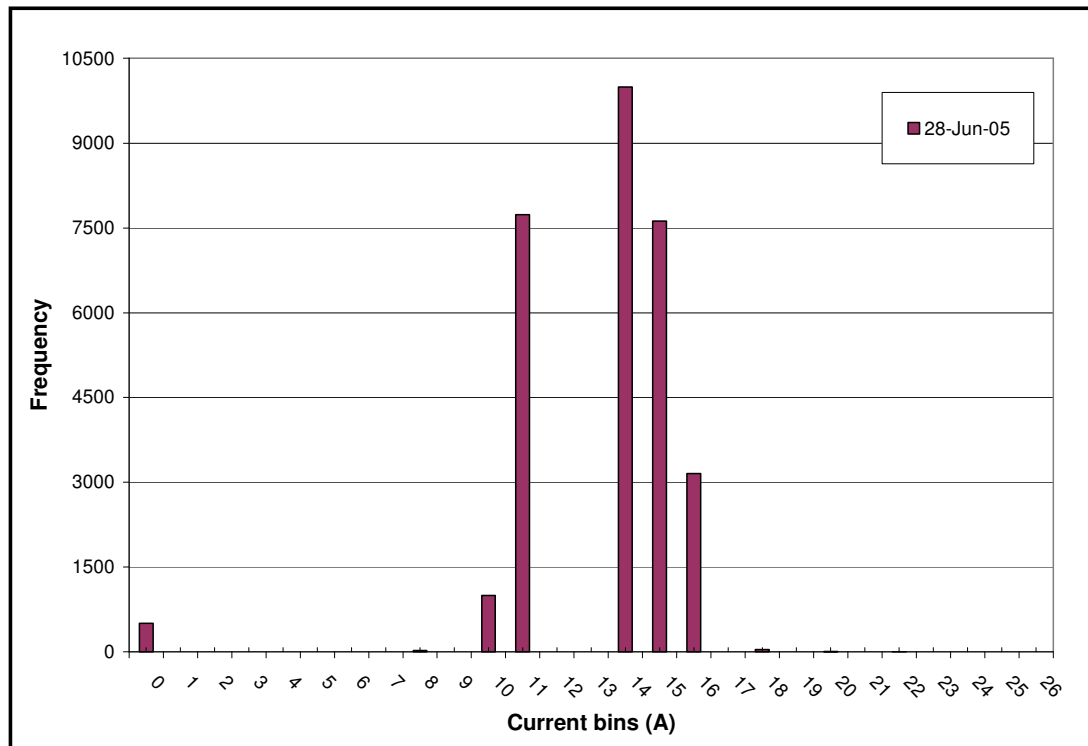


Figure Q.2-5: Histogram for current consumed by a conveyor motor.

Q.2.2.2 Afternoon shifts

Table Q-6: Data for the total consumption of a conveyor motor in section 51.

	28-Jun-05
Tonnes/CM/Shift	1740
% Time of shift producing	91.83%
% of Production time underloaded	100.00%
% of Production time overloaded	0.00%

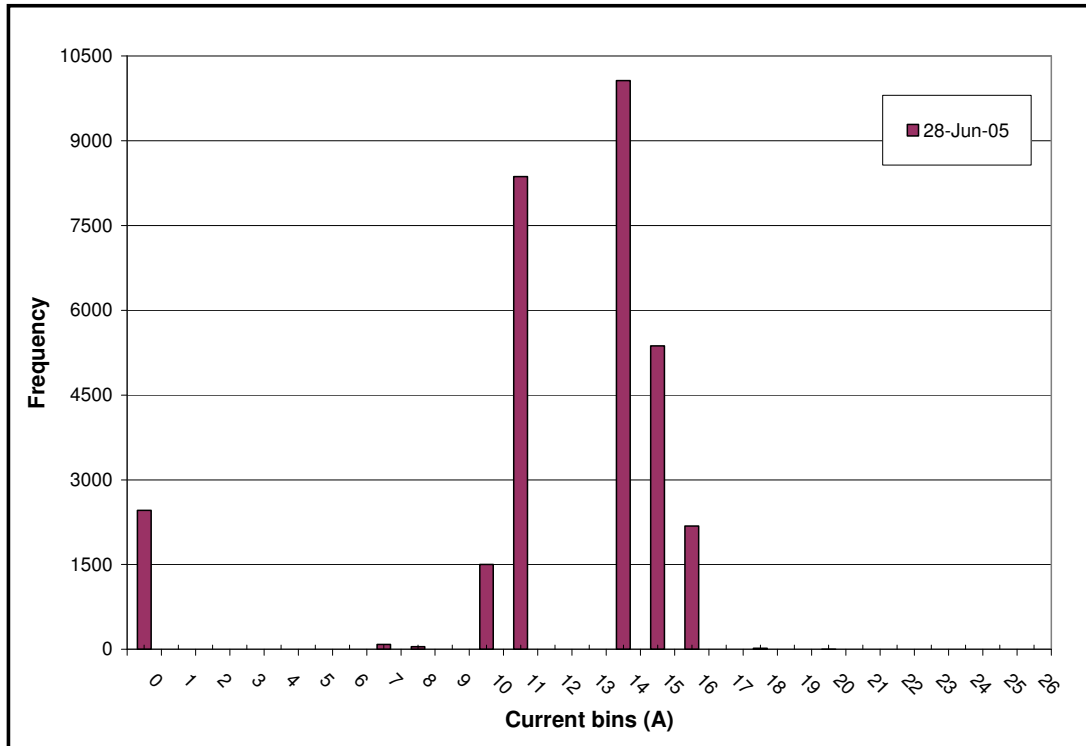


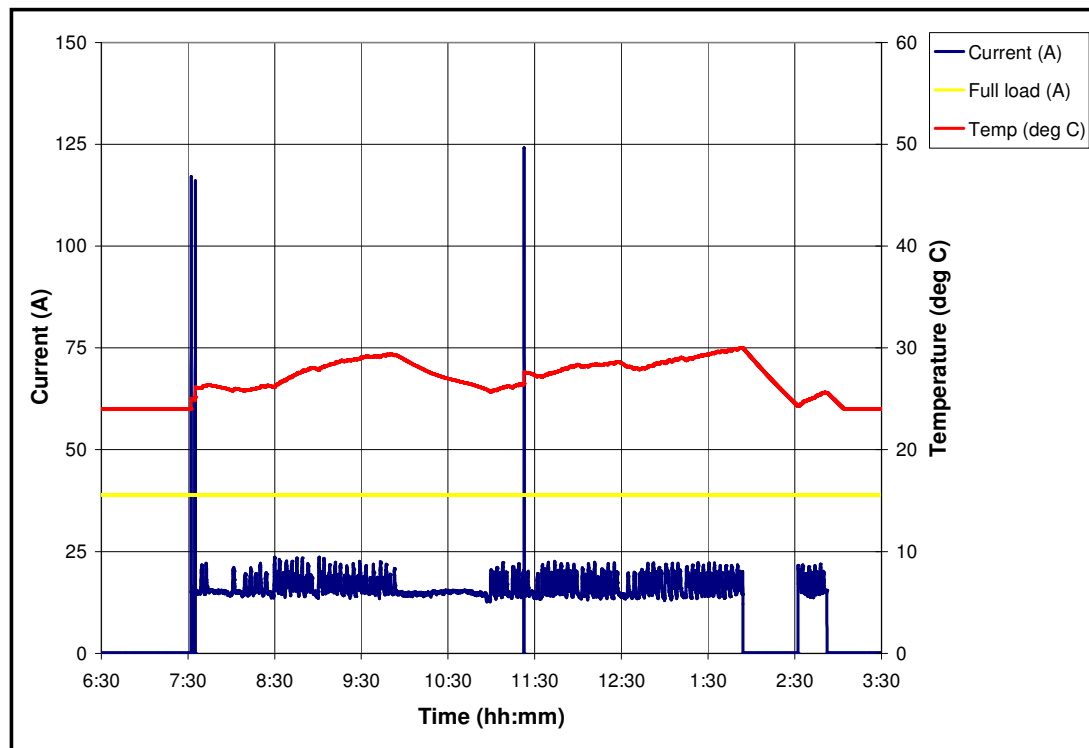
Figure Q.2-6: Histogram for current consumed by a conveyor motor.

Q.3 THERMAL CAPACITY

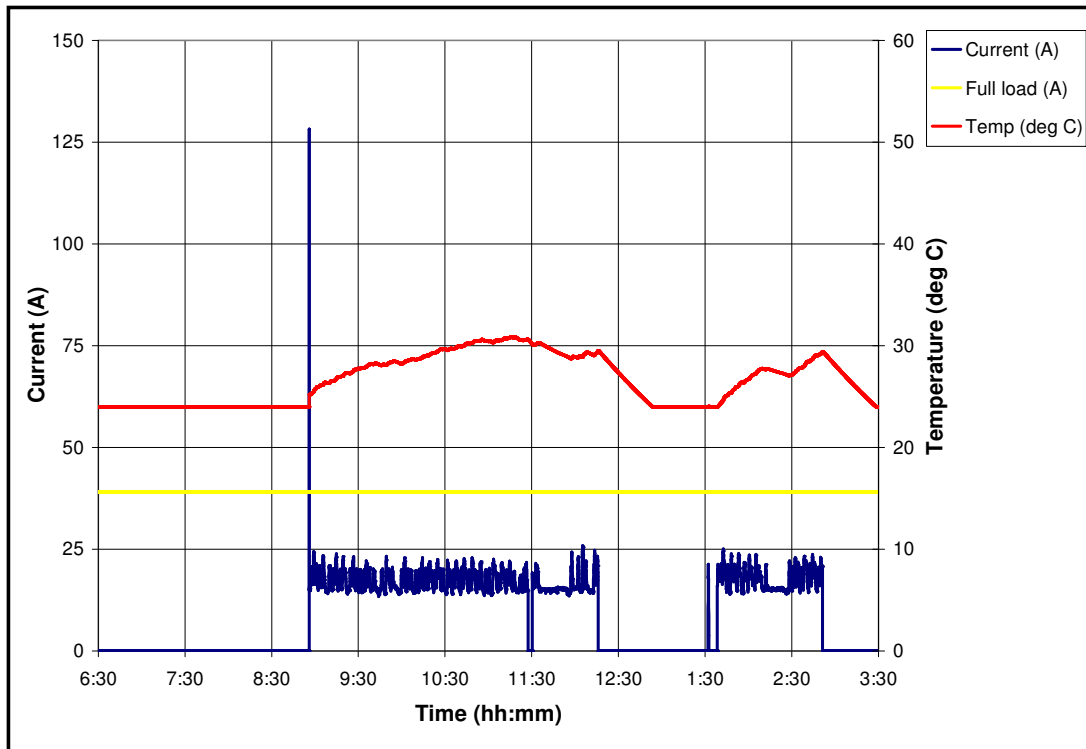
The next section focuses on the temperature of the windings of the conveyor motor. Each graph shows the temperature of the motor, the load current and rated full load current of the motor. The morning shifts and afternoon shifts are separated as well as the measurements made at the different sections. The thermal time constant is 45 minutes.

Q.3.1 SECTION 21

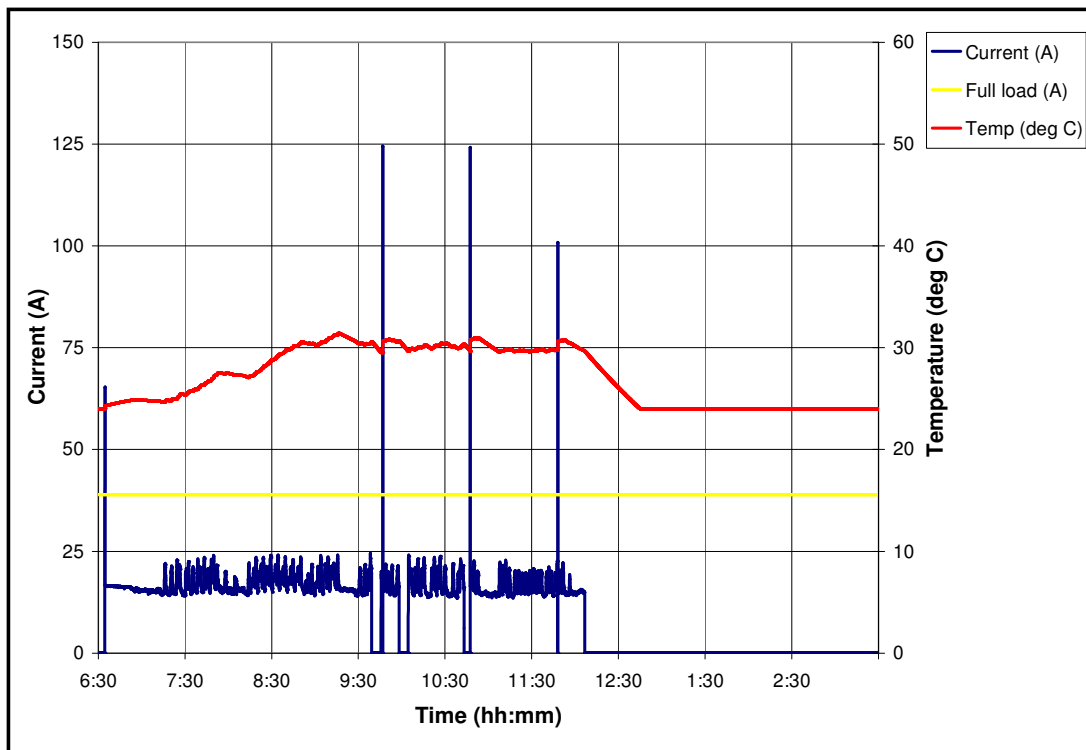
Q.3.1.1 Morning shifts



**Figure Q.3-1: Load current and motor temperature for a conveyor motor
– 31 May 2005.**

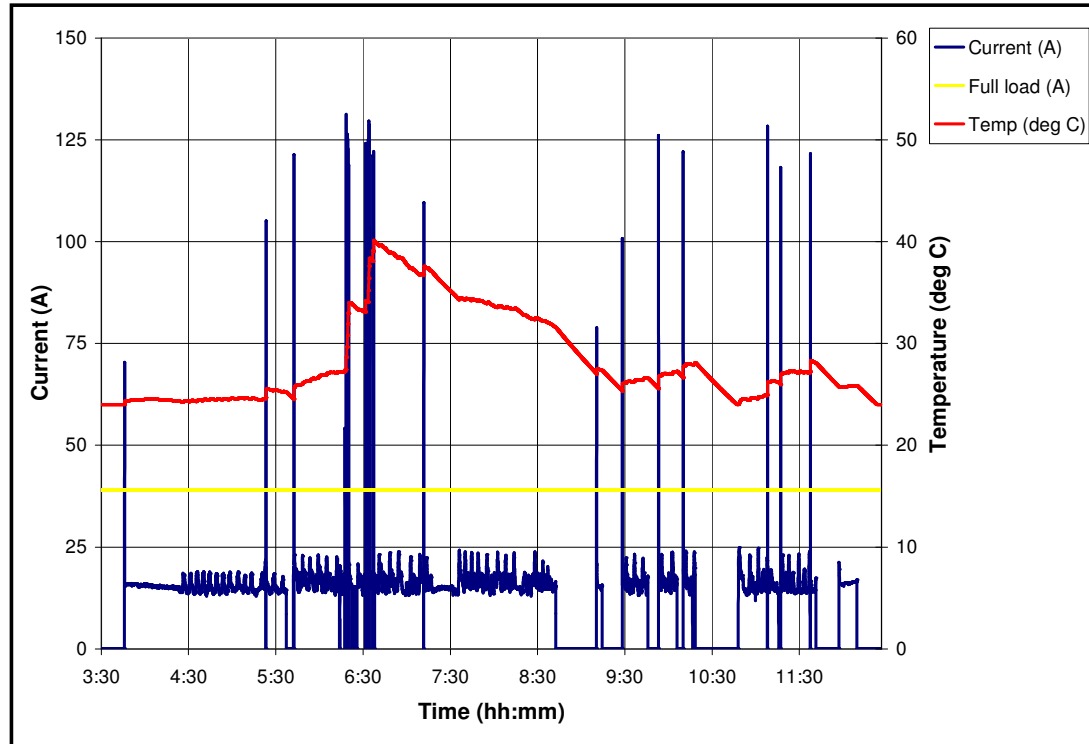


**Figure Q.3-2: Load current and motor temperature for a conveyor motor
– 01 June 2005.**

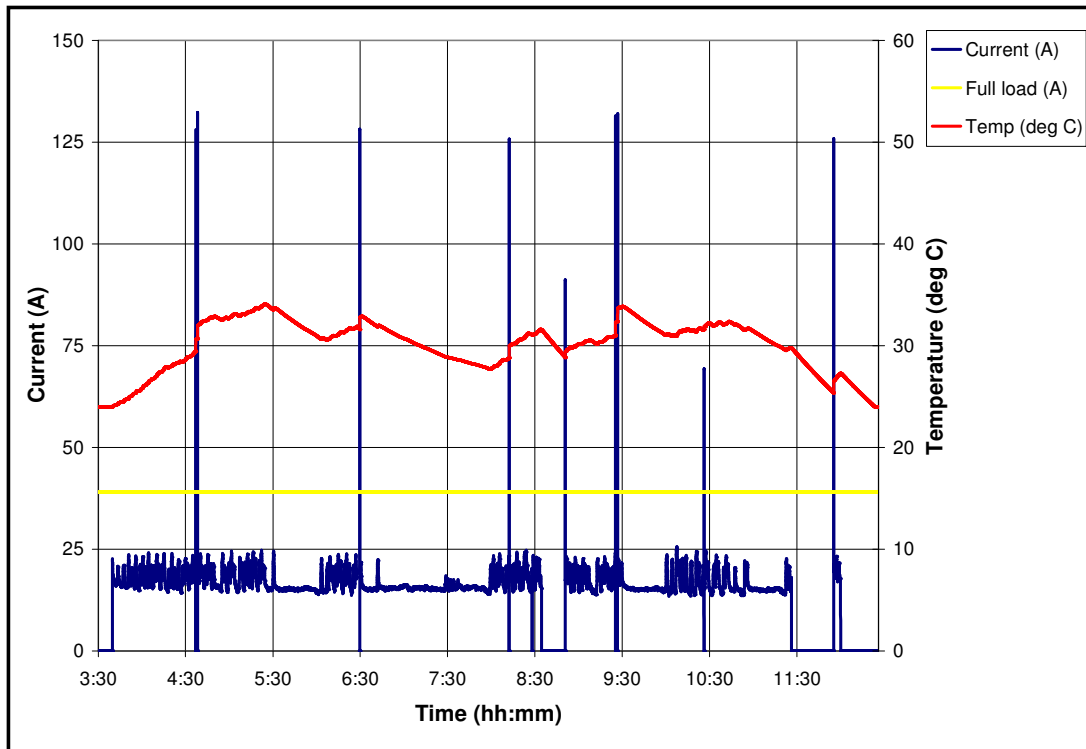


**Figure Q.3-3: Load current and motor temperature for a conveyor motor
– 02 June 2005.**

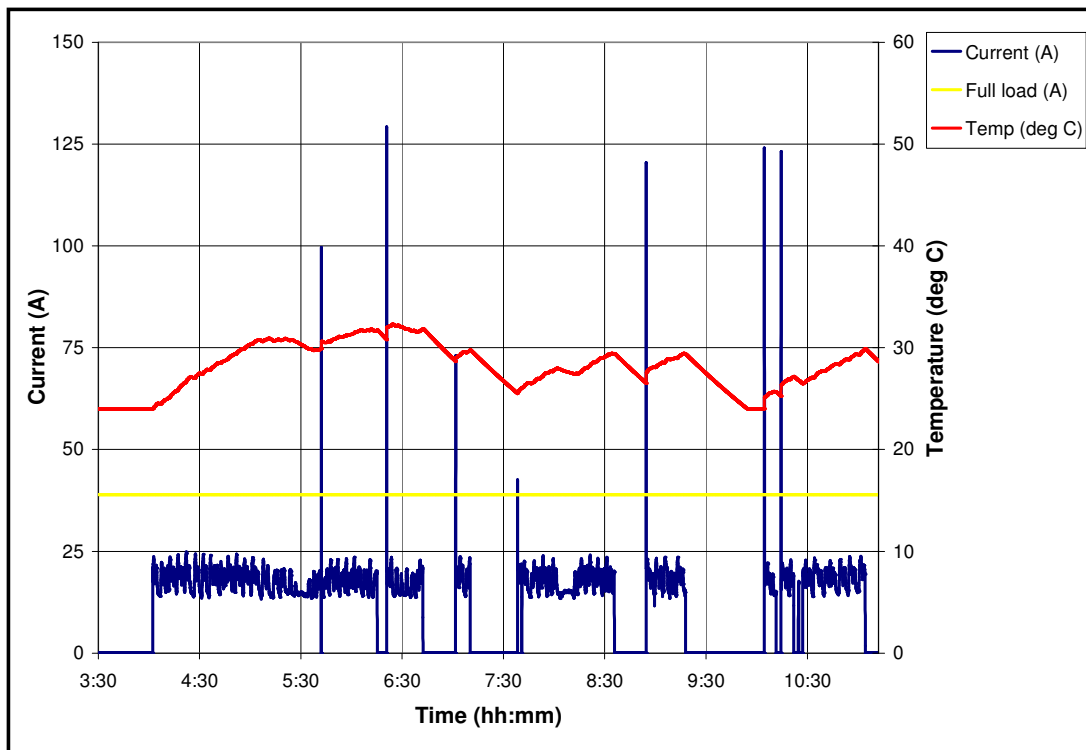
Q.3.1.2 Afternoon shifts



**Figure Q.3-4: Load current and motor temperature for a conveyor motor
– 31 May 2005.**



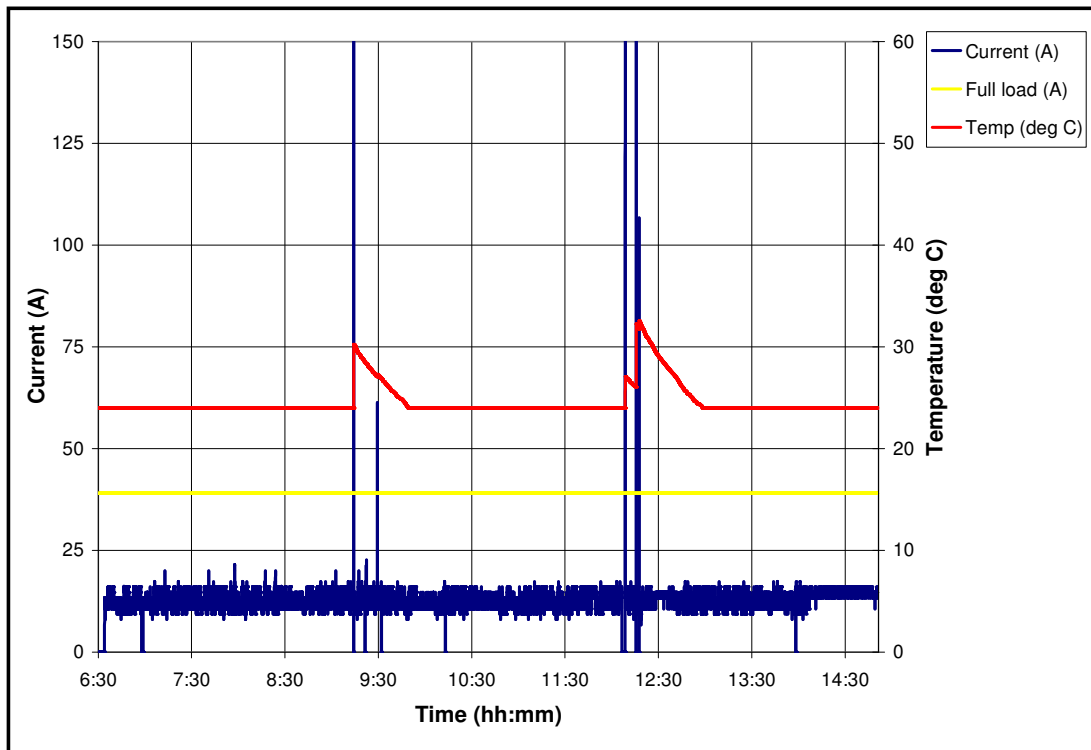
**Figure Q.3-5: Load current and motor temperature for a conveyor motor
– 01 June 2005.**



**Figure Q.3-6: Load current and motor temperature for a conveyor motor
– 02 June 2005.**

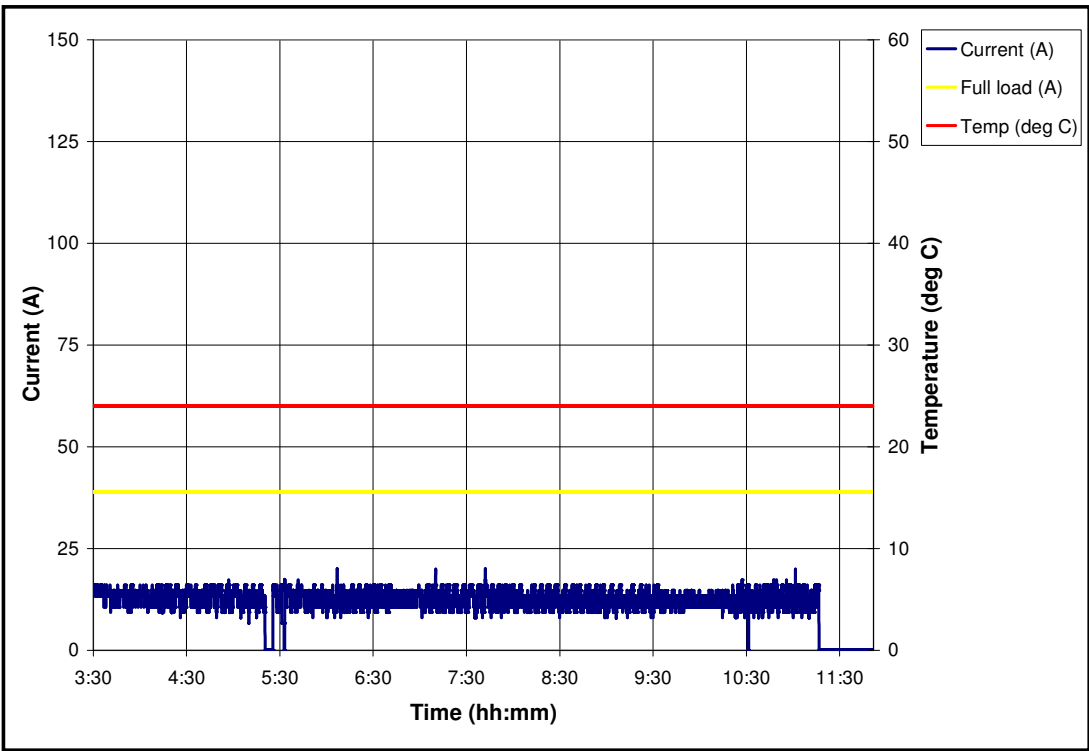
Q.3.2 SECTION 51

Q.3.2.1 Morning shifts



**Figure Q.3-7: Load current and motor temperature for a conveyor motor
– 28 June 2005.**

Q.3.2.2 Afternoon shifts



**Figure Q.3-8: Load current and motor temperature for a conveyor motor
– 28 June 2005.**