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APPENDIX O

SHUTTLE CAR PUMP MOTOR

Typical nameplate data for the pump motor of a Roofbolter can be seen in Table O-1. The pump motor measured at both sections was a 30 kW induction motor with a full load current rating of 20 A.

Table O-1: Nameplate data of the pump motor on a SC.

Shuttle car Pump Motor				
Power	15	kW	Voltage	950 V
Duty	S1		Current	11.8 A
Ins class	F		RPM	1460
			pf	0.86

Table O-2: Production figures for shifts that the pump motor was investigated.

Date	Sect 51		Sect 50	
	Morning	Afternoon	Morning	Afternoon
4-Jul-2005	-	-	1800	2124

O.1 LOAD PROFILE

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

O.1.1 SECTION 21

O.1.1.1 Morning shifts

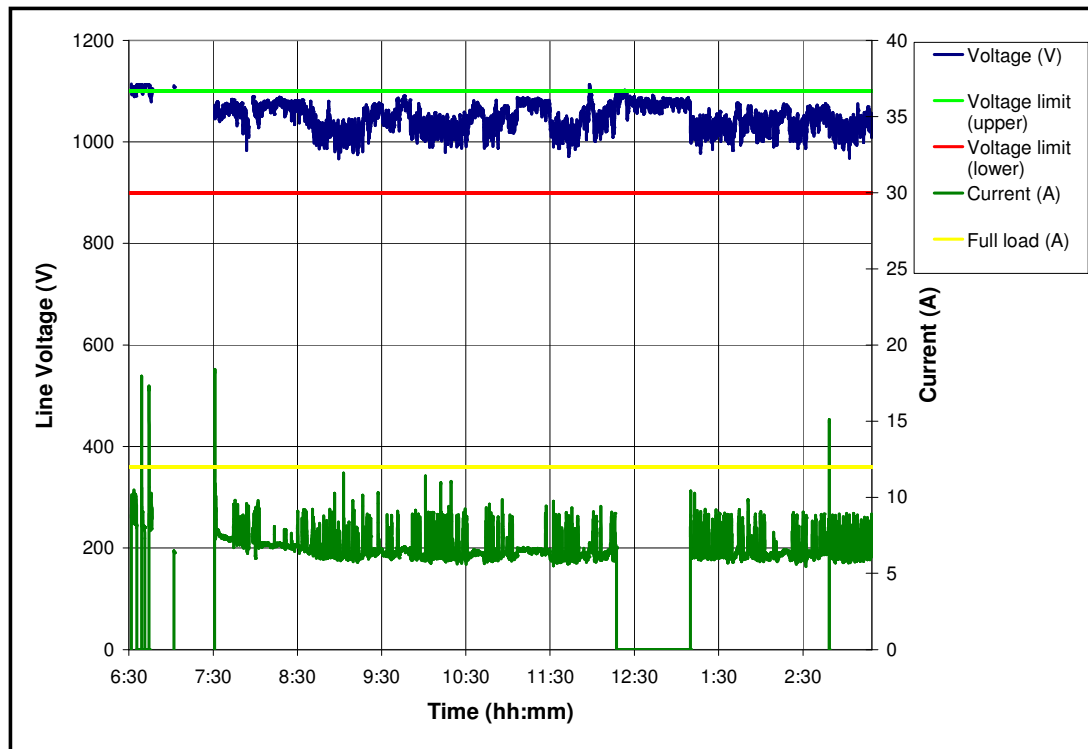
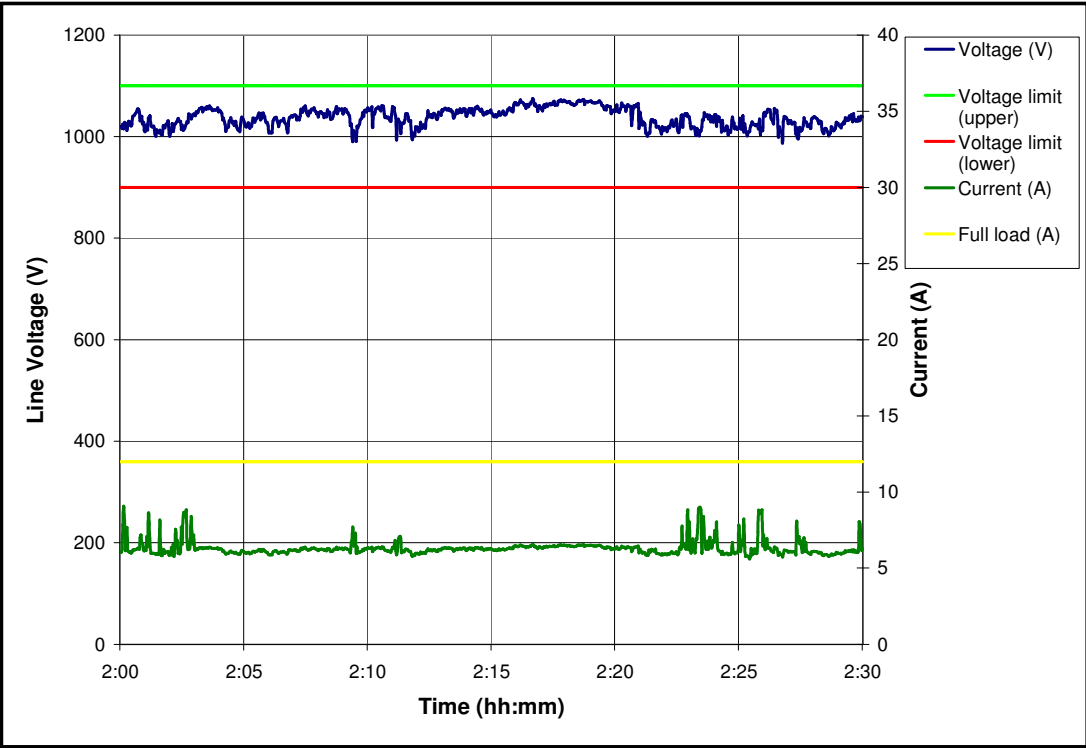


Figure O.1-1: Load current and voltage for a pump motor – 4 July 2005.



**Figure O.1-2: Load current and voltage for a pump motor
 – 4 July 2005 (30 minute period).**

O.1.1.2 Afternoon shifts

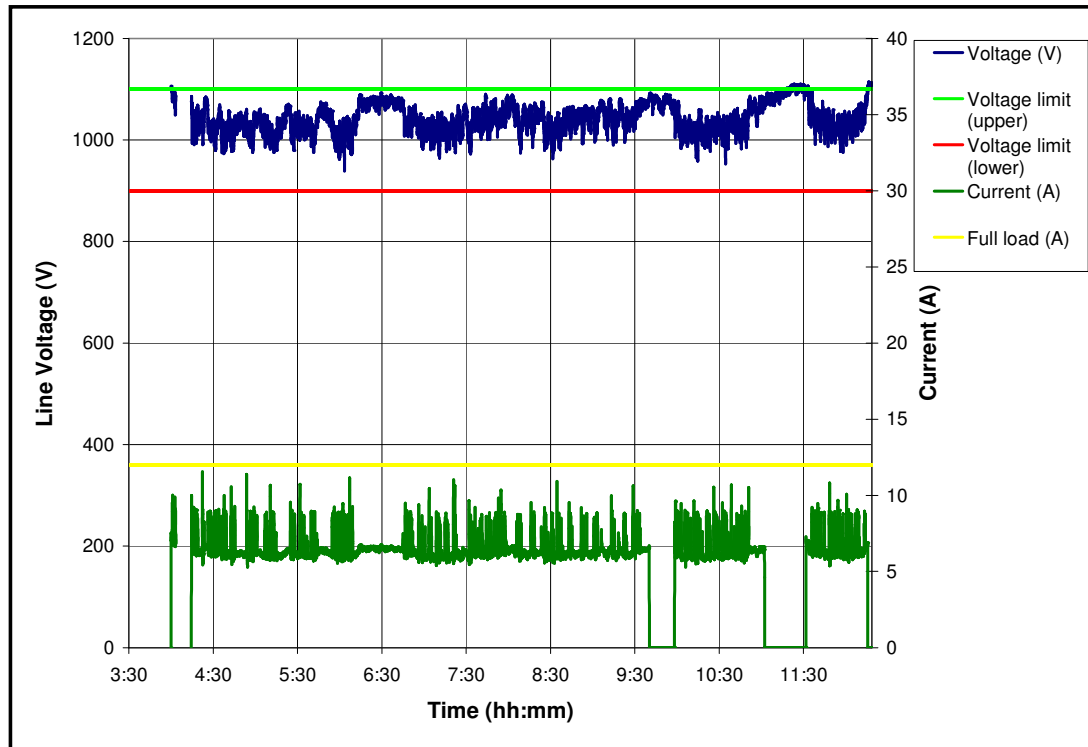
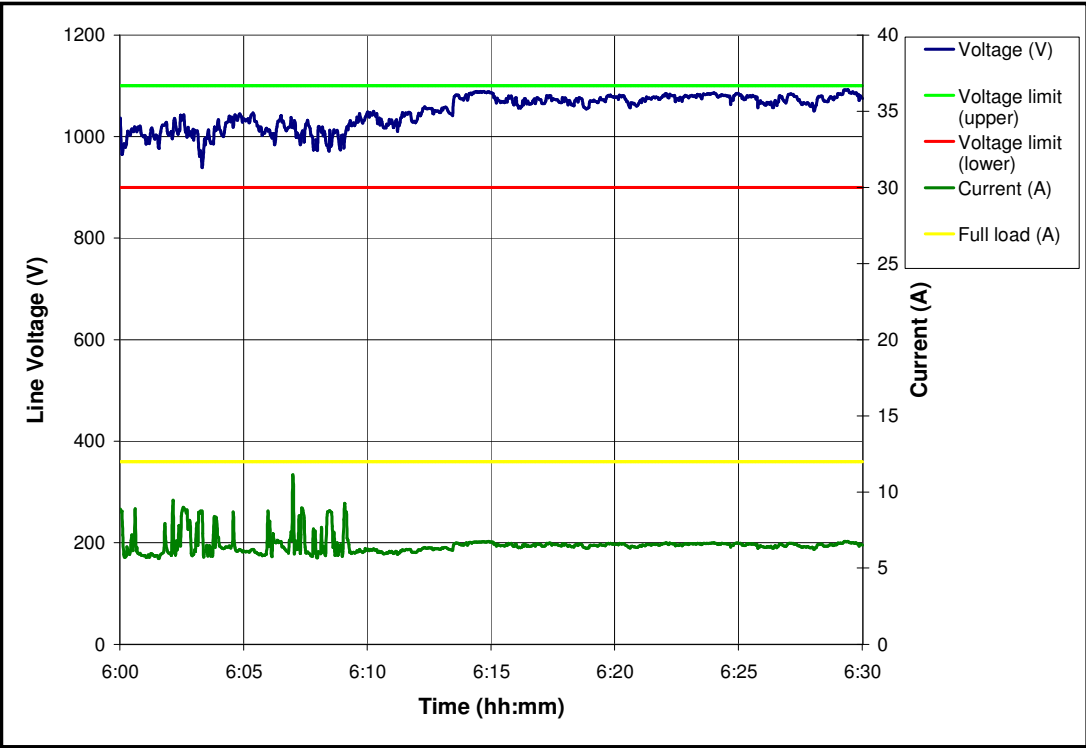


Figure O.1-3: Load current and voltage for a pump motor – 4 July 2005.



**Figure O.1-4: Load current and voltage for a pump motor
 – 4 July 2005 (30 minute period).**

O.2 HISTOGRAM

The next section focuses on the frequency with which a Shuttle cars pump 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.

O.2.1 SECTION 50

O.2.1.1 Morning shifts

Table O-3: Data for the total consumption of a pump motor in section 50.

	04-Jul-05
Tonnes/CM/Shift	1800
% Time of shift producing	87.69%
% of Production time underloaded	99.97%
% of Production time overloaded	0.03%

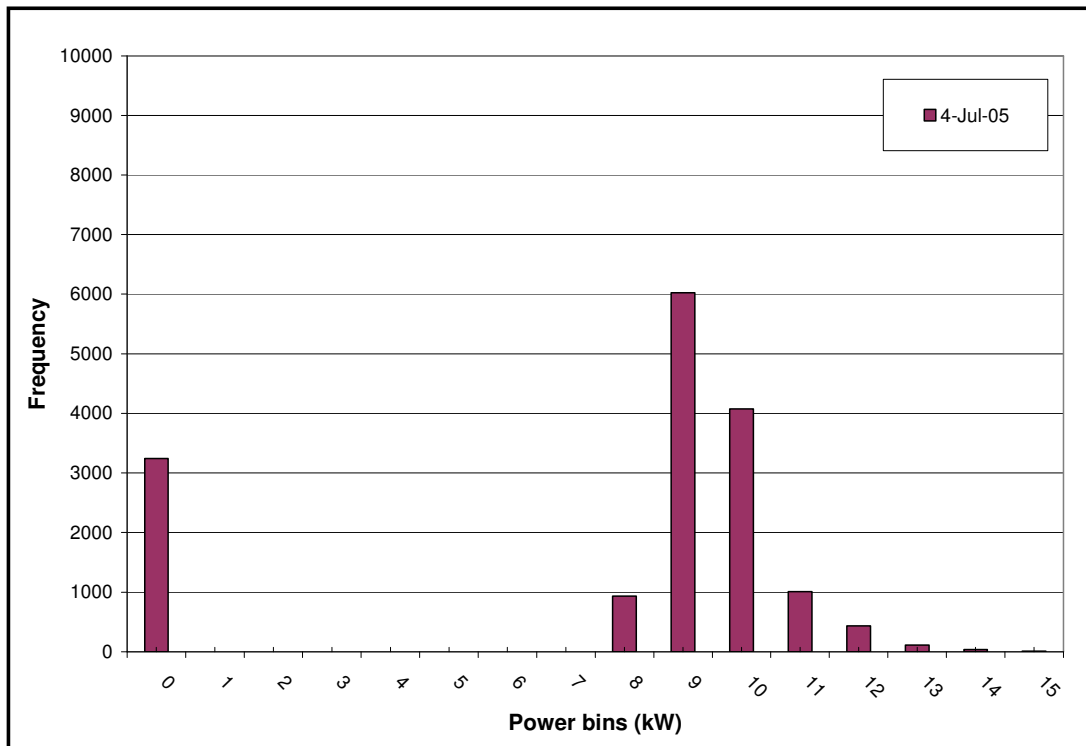


Figure O.2-1: Histogram for power consumed by a pump motor.

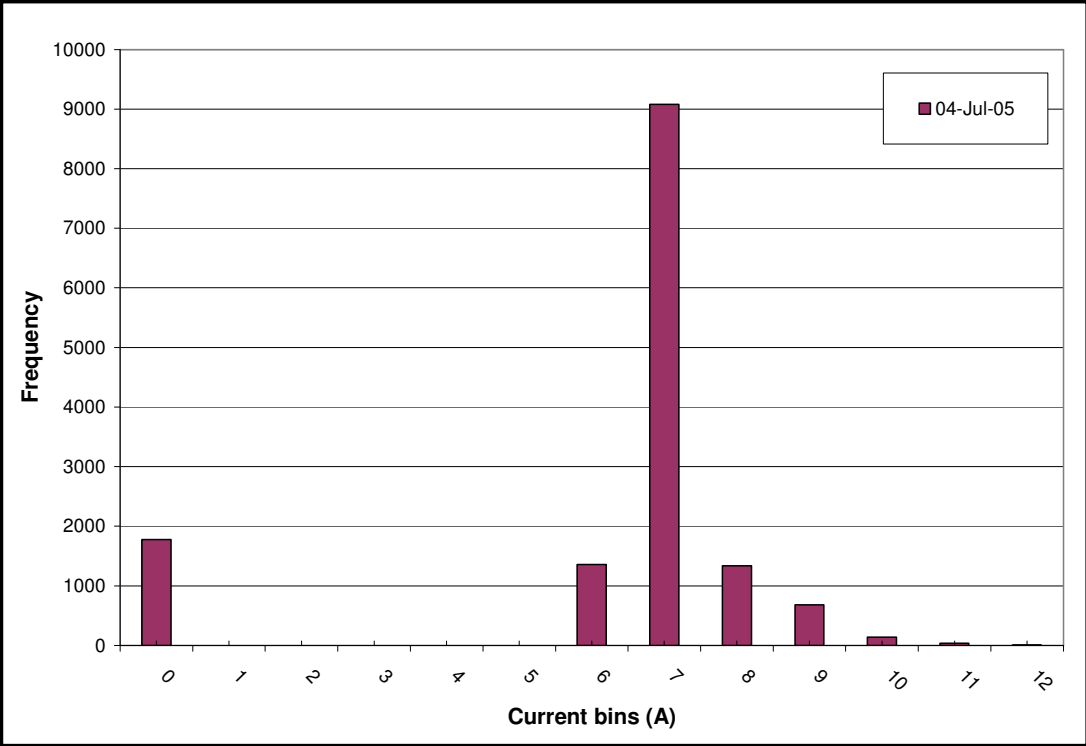


Figure O.2-2: Histogram for current consumed by a pump motor.

O.2.1.2 Afternoon shifts

Table O-4: Data for the total consumption of a pump motor in section 50.

	04-Jul-05
Tonnes/CM/Shift	2124
% Time of shift producing	89.64%
% of Production time underloaded	100.00%
% of Production time overloaded	0.00%

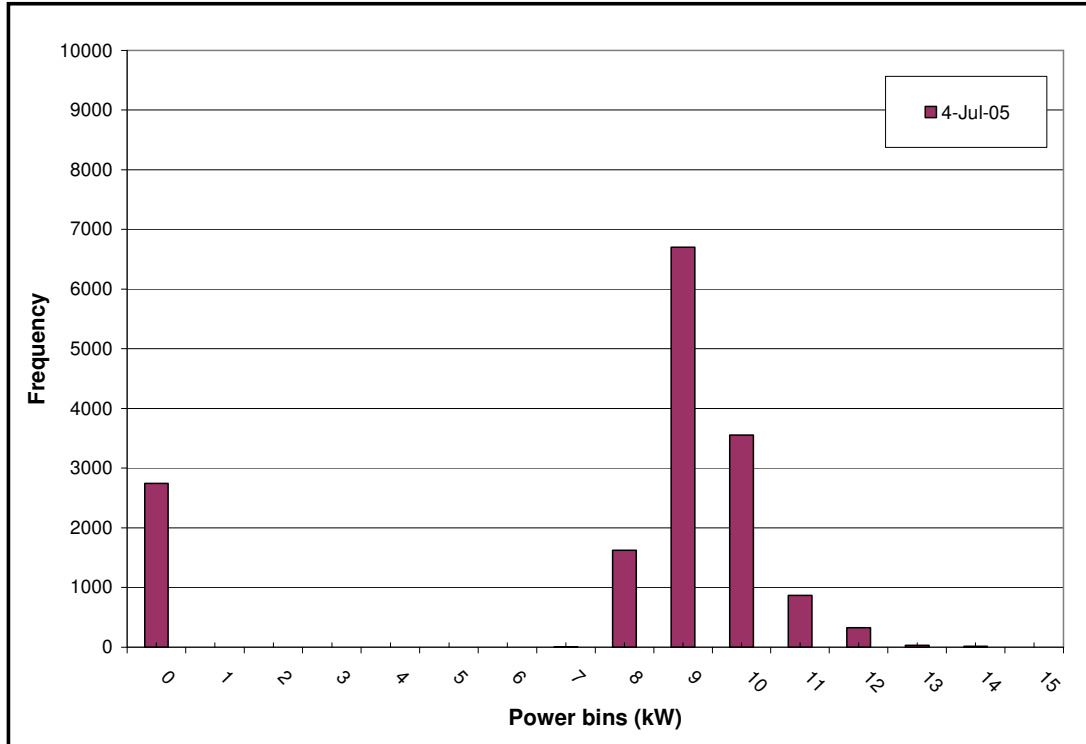


Figure O.2-3: Histogram for power consumed by a pump motor.

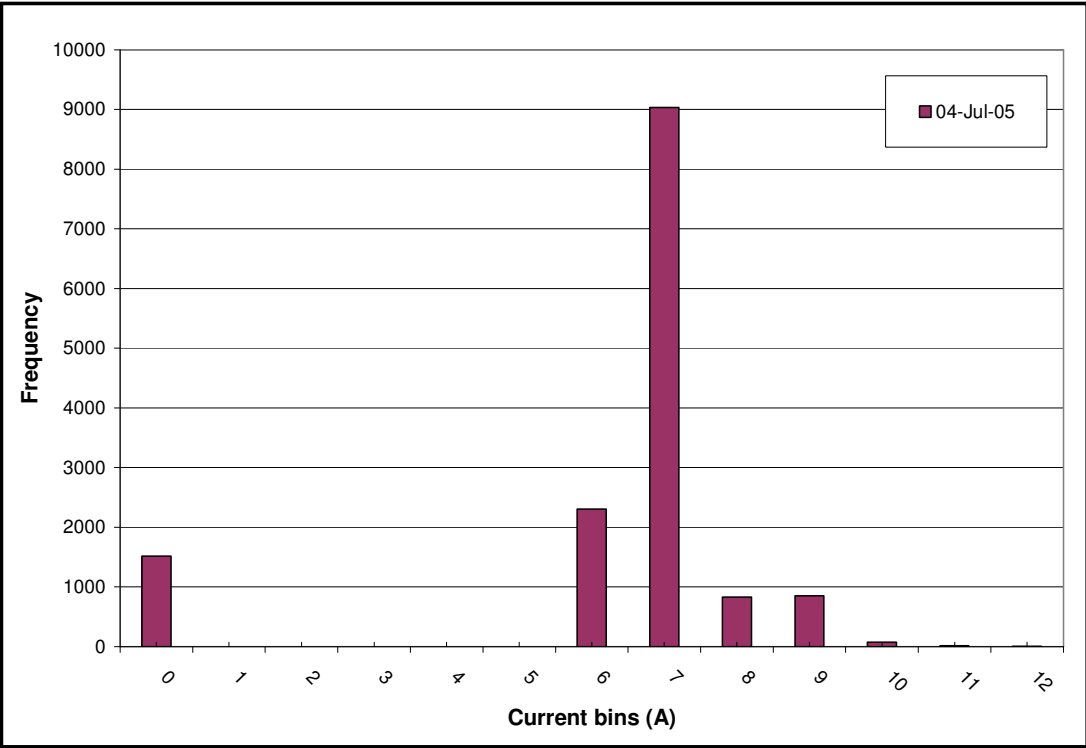


Figure O.2-4: Histogram for current consumed by a pump motor.

O.3 THERMAL CAPACITY

The next section focuses on the temperature of the windings of the pump 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 30 minutes.

O.3.1 SECTION 21

O.3.1.1 Morning shifts

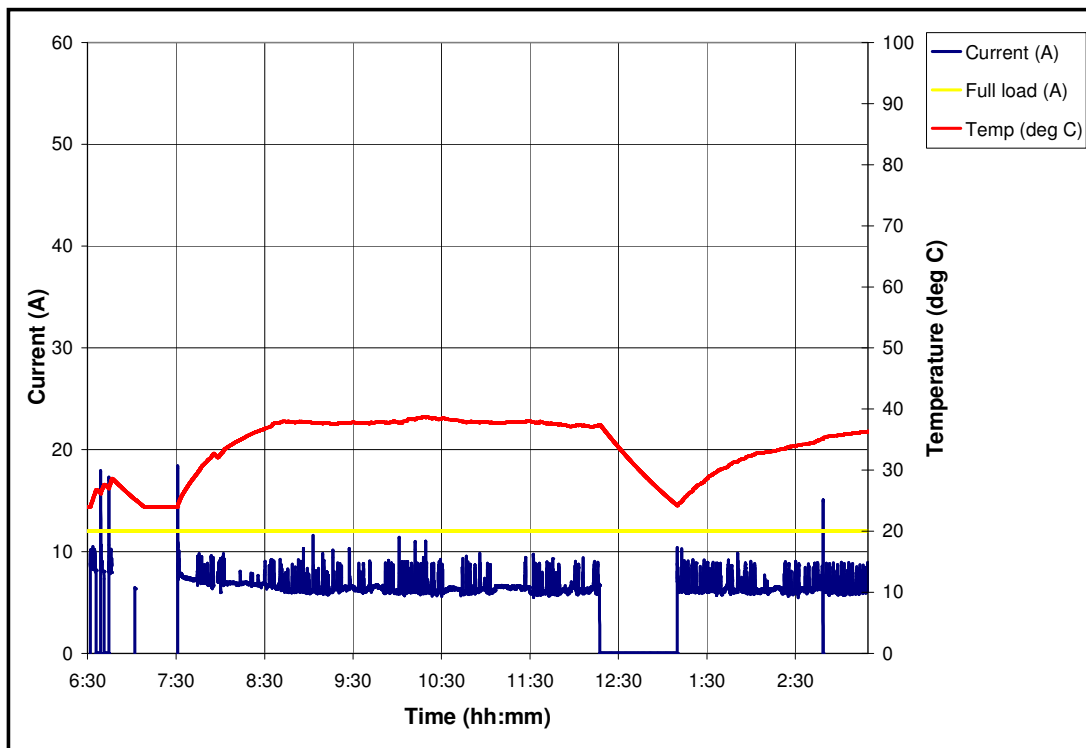
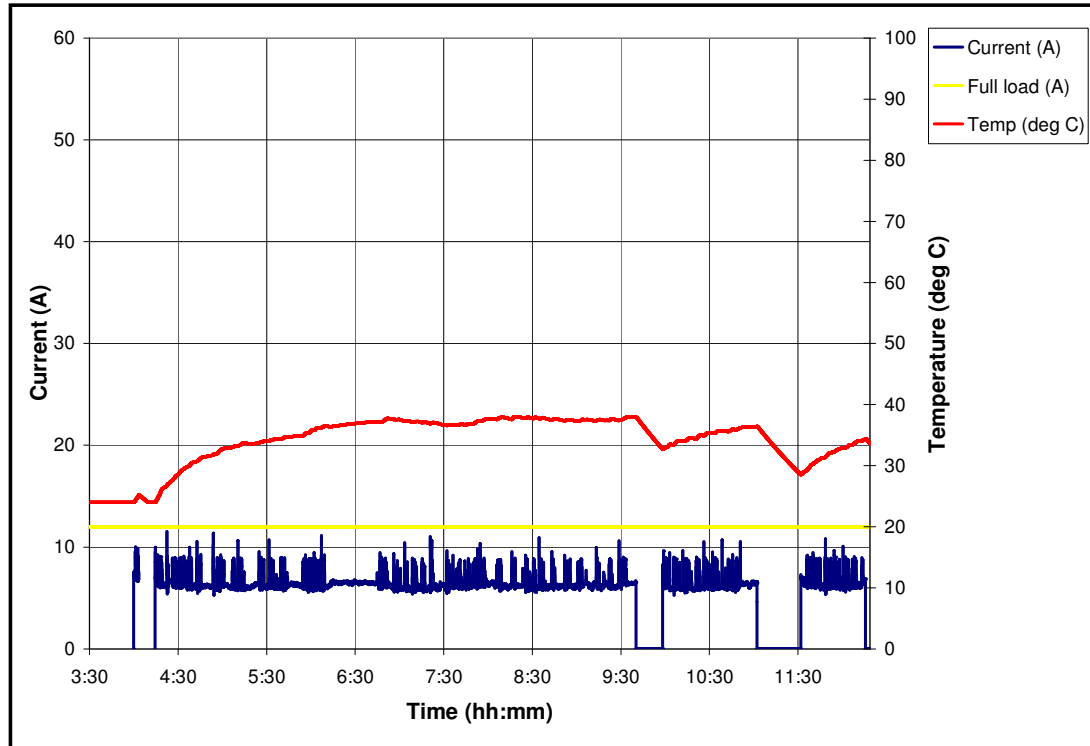


Figure O.3-1: Load current and motor temperature for a pump motor
– 4 July 2005.

O.3.1.2 Afternoon shifts



**Figure O.3-2: Load current and motor temperature for a pump motor
– 4 July 2005.**