

# Remote Asset Monitoring System



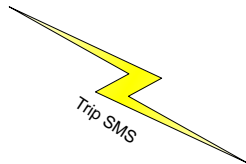
ISV/Software Solutions



# System Communications Overview

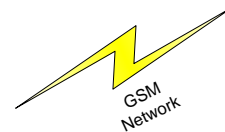
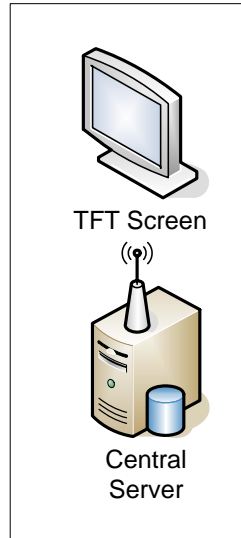


Responsible Person: Silo



- 0 Logs all SMS data to the database
- 0 Raises alarm when trip SMS received
- 0 Sends trip notification to selected recipients
- 0 Allows remote access to Silos and Trucks
- 0 Reporting and scheduled e-mailed reporting

## Central Server



## Silo Controller



### Transmits SMS to server:

- 0 On pump start and stop (1 min. damped)
- 0 Every morning
- 0 On trips

### Logs Daily:

- 0 Mass pumped
- 0 Current Level
- 0 Safety levels
- 0 Duration of pumping activity
- 0 Hour meter

**Remotely accessible**  
20 message SMS log



## Truck Controller



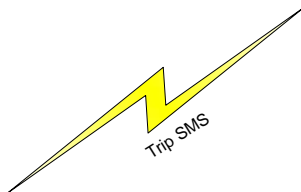
### Transmits SMS to server:

- 0 Every morning
- 0 On trips
- 0 On service request (operator function)

### Logs Daily:

- 0 Component masses
- 0 Hole count
- 0 Safety levels
- 0 Duration of pumping activity

**Remotely accessible**  
20 message SMS log



Responsible Person: Truck

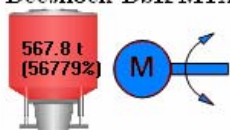




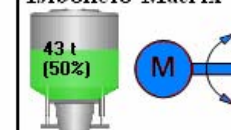

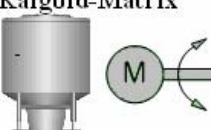










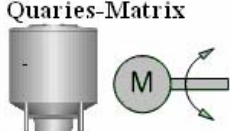
**Control Room Communications Overview**  
**Prepared by Motswedi TLC**

**April 2006**

# Main Screen

File Database Help

Silos Trucks Tankers

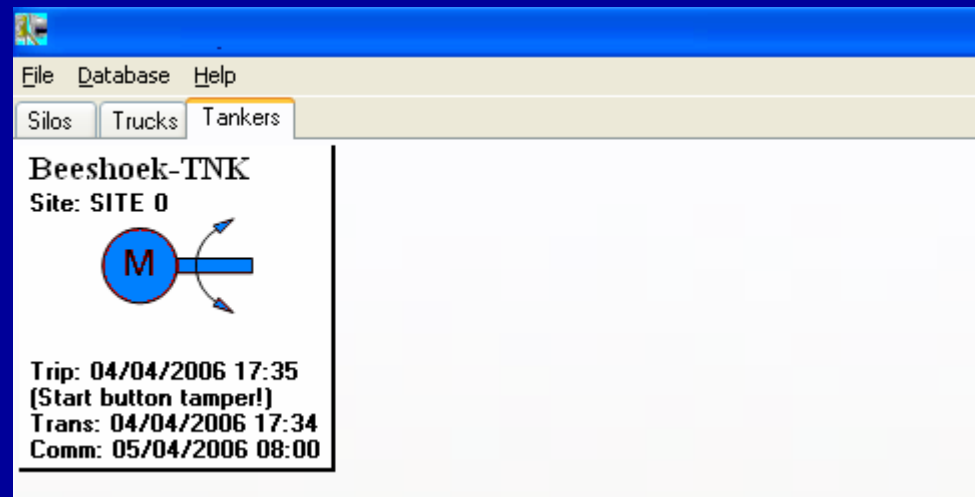
<b>Beeshoek-BSK MTX</b>  Trip: 11/04/2005 18:02 (Stator Temp: 234.5 °C) Trans: - Comm: -	<b>Beeshoek-Matrix</b>  Trip: - Trans: - Comm: -	<b>Beeshoek-PPAN</b>  Trip: - Trans: - Comm: -	<b>Foskor-Matrix</b>  Trip: 07/10/2005 07:04 (Pres 1: 78.8 kPa) Trans: 11/10/2005 06:38 Comm: 10/10/2005 16:00	<b>Foskor-PPAN</b>  Trip: - Trans: - Comm: -	<b>Isibonelo-Matrix</b>  Trip: 11/10/2005 14:56 (Pres 1: 12.7 kPa) Trans: 06/10/2005 12:41 Comm: 11/10/2005 14:55
<b>Isibonelo-PPAN</b>  Trip: - Trans: - Comm: -	<b>Kalgold-Matrix</b>  Trip: - Trans: - Comm: -	<b>Kalgold-PPAN</b>  Trip: - Trans: - Comm: -	<b>Khutala-Matrix</b>  Trip: 11/10/2005 07:17 (Product Temp: 75 °C) Trans: 11/10/2005 09:08 Comm: 10/10/2005 16:00	<b>Khutala-PPAN</b>  Trip: - Trans: - Comm: -	<b>Klipfontein-Matrix</b>  Trip: - Trans: - Comm: -
<b>Klipfontein-PPAN</b>  Trip: - Trans: - Comm: -	<b>Lonmin-Matrix</b>  Trip: 23/10/2005 06:30 (Pres 1: 169.8 kPa) Trans: 23/10/2005 06:51 Comm: 11/10/2005 15:08	<b>Lonmin-PPAN</b>  Trip: - Trans: - Comm: -	<b>MMS 1-Matrix</b>  Trip: - Trans: - Comm: -	<b>MMS 1-PPAN</b>  Trip: - Trans: - Comm: -	<b>MMS 2-Matrix</b>  Trip: - Trans: - Comm: -
<b>Quaries-Matrix</b>  Trip: - Trans: - Comm: -					

Edit Database Clear Alarm

Signal Strength 56 %

# Asset Monitoring/Display

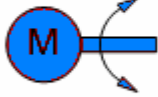
- Various Asset categories
- Representation with or without graphics.
- Customisable list of monitored parameters.
- Trip conditions monitored and displayed



File Database Help

Silos Trucks Tankers

Beeshoek-TNK  
Site: SITE 0



Trip: 04/04/2006 17:35  
(Start button tamper!)  
Trans: 04/04/2006 17:34  
Comm: 05/04/2006 08:00



Asset Name	Trip	Additional Info	Engine Hours	Comm
Isibonelo-724	Trip: -	Holes Pumped: 0	Engine hours: 0	Comm: -
Beeshoek-454	Trip: 30/06/2005 14:15	(BPX Pres: -249.7 kPa)	Holes Pumped: 0	Engine hours: 0
Khutala-730	Trip: 12/04/2005 18:02	(BPX Prod T: 345.6 °C)	Holes Pumped: 28	Engine hours: 3456
Khutala-731	Trip: -	Holes Pumped: 0	Engine hours: 0	Comm: -

# Trip Condition

- Trips indicated visually and audibly.
- Trips acknowledged and cleared by entering Staff Code.
- Ensures correct action is taken.

The screenshot displays the 'Monitoring System Demo' interface with the following components:

- Main Window:**
  - Menu: File Database Help
  - Tabs: Vehicles Trucks Tankers
  - Grid of vehicle cards:
    - Beeshoek-Demo V:** Lat: -26, Long: 28. Trip: 07/04/2006 16:39 (Over-rev: 4603.5 rpm). Trans: -. This card is highlighted in red.
    - Beeshoek-Matrix:** Lat: -26, Long: 28. Trip: -. Trans: -. Comm: -.
    - Beeshoek-RXT301:** Lat: -26, Long: 28. Trip: 07/04/2006 16:39 (Over-rev: 4603.5 rpm).
    - Khutala-Matrix:** Lat: -26, Long: 28. Trip: 11/10/2005 07:1.
    - Khutal:** Lat: -26, Long: 28.
- TLC Alarms Window:**
  - Title: TLC Alarms
  - Content: Acknowledge the following alarms:
    - Beeshoek-Demo V
  - Buttons: OK (with green checkmark), Cancel
- Verification Window:**
  - Title: Verification
  - Label: Enter staff number:
  - Text Input: fc123
  - Buttons: OK, Cancel

# Asset Database

The screenshot displays the TLC Database application interface. The main window shows a list of silos under the 'Silos' tab. A 'New Silo' dialog box is open, allowing for the creation of a new silo entry.

**Main Window Silo List:**

Silo Name	Description	Component	Capacity (ton)	High Warning Level	High Trip Level
KHU MTX	Matrix	Matrix	85	90	95
LMN MTX	Matrix	Matrix	85	85	90
FOS MTX	Matrix	Matrix	85	90	95
KLP MTX	Matrix	Matrix	85	90	95
MID1 MTX	Matrix	Matrix	85	90	95
MID2 MTX	Matrix	Matrix	85	90	95
KAL MTX	Matrix	Matrix	85	90	95
QAR MTX	Matrix	Matrix	85	90	95
KHU AN	PPAN	Prill	50	90	95
LMN AN	PPAN	Prill	50	90	95
FOS AN	PPAN	Prill	50	90	95
KLP AN	PPAN	Prill	50	90	95
MMS1 AN	PPAN	Matrix	60	90	95
KAL AN	PPAN	Prill	50	90	95
ISI MTX	Matrix	Matrix	85	90	95

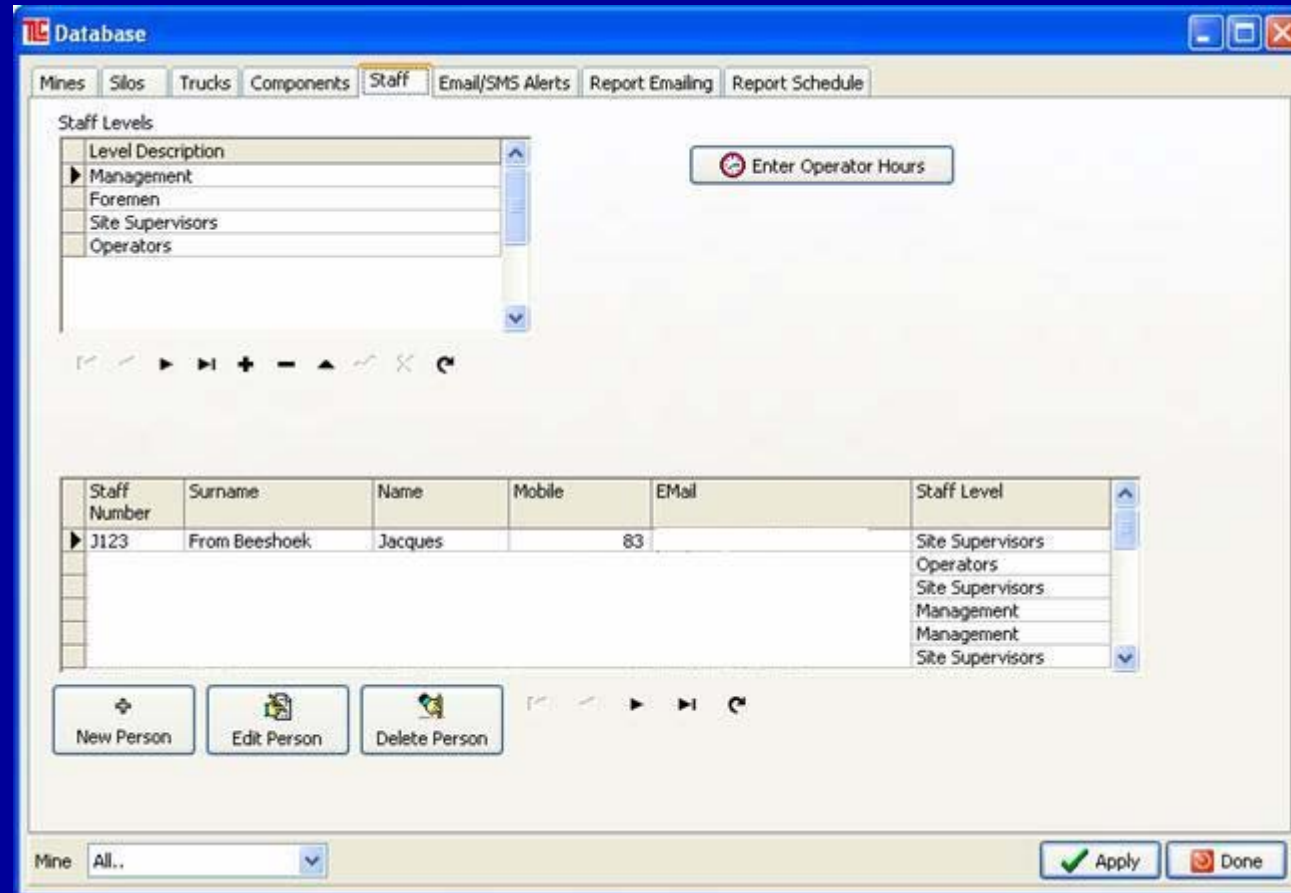
**New Silo Dialog Box Fields:**

- Mine: Beeshoek
- Component: Prill
- Silo Name: BHK AN
- Description (Max 8 characters): PPAN
- Mobile Number: 987
- Capacity (ton): 50
- Low Warning Level (%): 30
- Low Trip Level (%): 10
- High Warning Level (%): 90
- High Trip Level (%): 95
- Re-Order Level (%): 50
- Target Level (%): 50

Buttons: New Silo, Edit Silo, Delete Silo, OK, Cancel, Apply, Done.

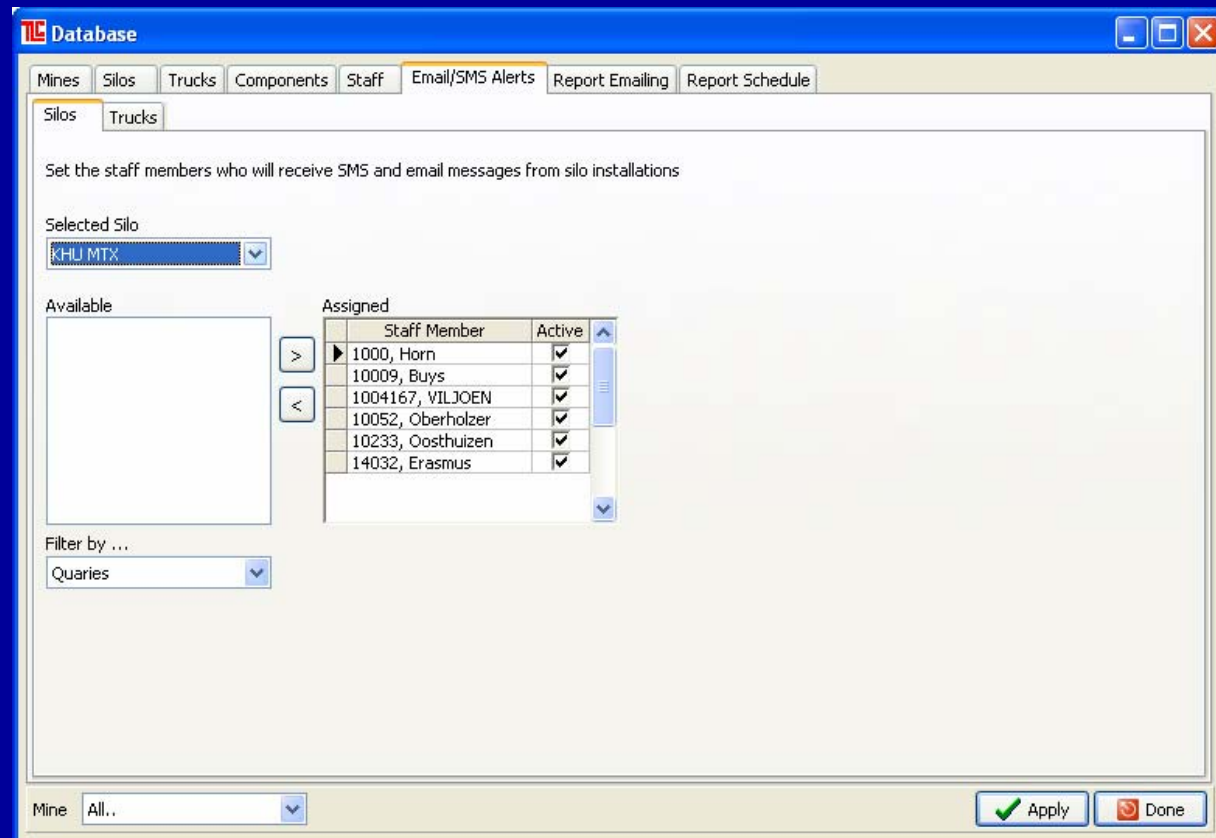
# Staff Database

- List of staff members.
- Contact details allow :
  - SMS notifications of trips.
  - Automated e-mailing of reports



# Trip Notification Recipients

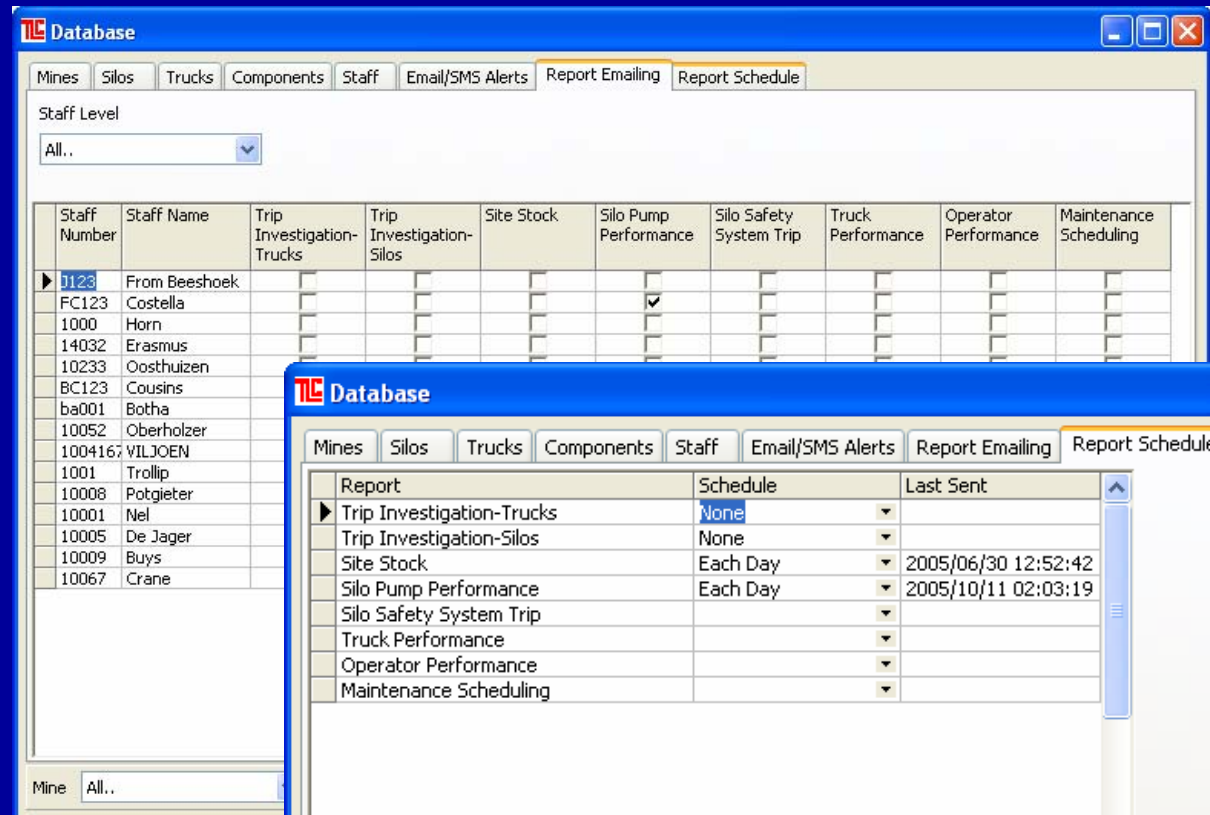
- Select Staff members to receive trip notifications.
- Customisable for each asset.





# Reports and Schedules

- Select who should receive what reports.
- Customisable each report's e-mail schedule.



The screenshot shows the 'TLC Database' application with the 'Report Schedule' tab selected. It displays a list of staff members and their associated report schedules.

Staff Number	Staff Name	Trip Investigation-Trucks	Trip Investigation-Silos	Site Stock	Silo Pump Performance	Silo Safety System Trip	Truck Performance	Operator Performance	Maintenance Scheduling
1123	From Beeshoek								
FC123	Costella				<input checked="" type="checkbox"/>				
1000	Horn								
14032	Erasmus								
10233	Oosthuizen								
BC123	Cousins								
ba001	Botha								
10052	Oberholzer								
1004167	VILJOEN								
1001	Trollip								
10008	Potgieter								
10001	Nel								
10005	De Jager								
10009	Buys								
10067	Crane								

Report	Schedule	Last Sent
▶ Trip Investigation-Trucks	None	
Trip Investigation-Silos	None	
Site Stock	Each Day	2005/06/30 12:52:42
Silo Pump Performance	Each Day	2005/10/11 02:03:19
Silo Safety System Trip		
Truck Performance		
Operator Performance		
Maintenance Scheduling		

# Report Examples

1 of 14    83%    Total:152    100%    152 of 152

**System Report**

**Silo Safety System Trip Report**

**Print Date:** 2006/04/05  
**For Period:** 2004/04/05 to 2006/04/05

Silo	Date and Time	Channel	Level	Acknowledge		Corrective Action Number	Preventative Action Number
				Time	Surname		
Lonmin-Matrix	19/08/2005 14:34	Product Press2	96.1	21/08/2005 14:39	Costella		
Lonmin-Matrix	19/08/2005 14:42	Product Press	96.4	21/08/2005 14:45	Costella		
Lonmin-Matrix	19/08/2005 15:34	Product Temp	71	24/08/2005 07:24	Oosthuizen		
Khutala-Matrix	22/08/2005 12:02	Product Press	57.8	24/08/2005 12:03	Oosthuizen		
Khutala-Matrix	22/08/2005 12:08	Stator Temp	212	24/08/2005 12:10	Oosthuizen		
Khutala-Matrix	22/08/2005 12:20	Product Press2	62.8	24/08/2005 12:50	Oosthuizen		
Lonmin-Matrix	22/08/2005 11:48	Product Press	133.5	25/08/2005 13:03	Costella		
Lonmin-Matrix	24/08/2005 08:25	Start Button Tamper		24/08/2005 08:29	VILJOEN		
Khutala-Matrix	24/08/2005 09:41	Product Press2	38.6	24/08/2005 09:44	VILJOEN		
Khutala-Matrix	24/08/2005 10:15	Product Press	39.8	24/08/2005 10:30	Oosthuizen		
Khutala-Matrix	24/08/2005 17:27	Product Press2	189.7	25/08/2005 07:55	VILJOEN		
Khutala-Matrix	26/08/2005 10:14	Product Press2	164.7	26/08/2005 10:35	Oosthuizen		
Lonmin-Matrix	27/08/2005 14:58	Stator Temp	61	28/08/2005 08:05	Oosthuizen		
Khutala-Matrix	27/08/2005 20:51	Product Press	102.7	28/08/2005 08:05	Oosthuizen		
Lonmin-Matrix	29/08/2005 12:41	Product Press2	187.0	29/08/2005 14:44	Oosthuizen		
Khutala-Matrix	29/08/2005 14:54	Product Press	39.6	29/08/2005 14:59	Oosthuizen		
Khutala-Matrix	29/08/2005 14:53	Product Press	168.8	29/08/2005 14:59	Oosthuizen		
Lonmin-Matrix	30/08/2005 07:59	Product Press2	158.4	30/08/2005 08:06	Oosthuizen		
Lonmin-Matrix	30/08/2005 08:43	Product Press2	188.7	30/08/2005 08:49	VILJOEN		

Page 1 of 14

# Report Examples

1 of 4    100%    Total:2312    100%    2312 of 2323

System Report

## Silo Pump Performance Report

**Print Date:** 2006/04/06

**For Period:** 2004/04/06 to 2006/04/06

<u>Silo</u>	<u>Transaction Date</u>	<u>Duration</u>	<u>Mass Dispensed</u>
<b>Beeshoek-BSK MTX(BSK MTX)</b>			
<b>Totals:</b>		<b>00:00:00</b>	<b>0.00</b>
<b>Site 1</b>			
	04/04/2006 11:06	00:03:36	0.60
	04/04/2006 11:06	00:03:36	0.60
	04/04/2006 11:51	00:08:16	0.70
	04/04/2006 12:03	00:07:08	0.60
<b>Totals:</b>		<b>00:25:51</b>	<b>2.50</b>
<b>Site 2</b>			
	21/09/2005 14:13	00:15:14	13.50
<b>Totals:</b>		<b>00:15:14</b>	<b>13.50</b>
<b>Site 3</b>			
	06/10/2005 08:13	00:00:00	0.30
	06/10/2005 09:49	00:00:00	0.20
	06/10/2005 10:23	00:00:00	0.60
<b>Totals:</b>		<b>00:00:00</b>	<b>1.10</b>
<b>Site 4</b>			
	24/08/2005 16:39	00:00:03	0.10
	24/08/2005 16:39	00:00:03	0.10
	24/08/2005 16:39	00:00:03	0.10
	24/08/2005 17:38	00:10:01	1.40



# Report Examples

1 of 1    100%    Total 2310    100%    2310 of 2310

System Report

## Site Stock Report

**Print Date:** 2006/04/05

**For Period:** 2004/04/05 to 2006/04/05

Silo	Mass Filled (kg)	Mass Dispensed (kg)
Site 1	4.40	2.50
Site 2	670.40	13.50
Site 3	306.60	1.10
Site 4	1,401.90	117.40
Site 5	1,557.50	769.10
<b>Grand Total:</b>	<b>3,940.80</b>	<b>903.60</b>

# System Specifications

- Designed to run on Windows XP or 2000.
- Uses MS SQL Server MSDE database (no additional licensing required).
- Remote monitoring systems:
  - Embedded microprocessors.
  - Communications by SMS and dial-up (cellular network coverage required).

# Remote System Specifications

- Two models available.
- Both available with LCD interface and watchdog.
- Model TLC-R001
  - 11x 24V Digital inputs (PNP/NPN configurable).
  - 4x 4-20mA powered inputs.
  - 2x RTD temperature inputs.
  - 2x 24V Counter inputs (PNP/NPN configurable).
  - 4x 24V Open-collector digital outputs.
  - 4x  $\pm 10V$  Analogue outputs.
- Model TLC-R002 (Truck Controller)
  - 16x 24V Digital inputs (PNP/NPN configurable).
  - 16x 4-20mA powered inputs.
  - 8x 24V Counter inputs (PNP/NPN configurable).
  - 16x 24V Open-collector digital outputs.
  - 16x  $\pm 10V$  Analogue outputs.
  - 2x  $\pm 0-20mA$  Analogue outputs.



# Contact Details:

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(Johannesburg, South Africa)
  - Luis Valentim, Terry Cousins
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