



"Mortar Silo Continuous Level Monitoring Solution for the Cement Industry"



#### **Key Points**

- Silotrak 'black box' on each silo, transmitting data back to the Silotrak web portal via SIM card
- 4 Main User Levels Logistics, Engineering, Site Personnel, Management
- Exceptions/faults/alarms can be emailed through to any number of personnel





## Logistics

- Silo level, with colour coded silo icons on the map to give real time indication of silo level (fully configurable) –
  - $\succ$  red = less than 10tns
  - amber = 10-20tns
  - $\succ$  green = more than 20tns
- Silos can be filtered by region, by zone or by customer
- Silo material usage reports
- Site utilization of the silo (how long has it been on site? usage frequency)
- Silotrak can link into 3<sup>rd</sup> party accounts systems
- 'Quick View' lists so the user can see all silos with less than 10tns of material left, with 10-20tns of material left and those silos above 20tns left lists can be sorted by region
- Information can be exported to Excel



#### Engineering

#### > Silo diagnostic information will be available in the Silotrak portal:

- Screw Tripped
- Water Pump Tripped
- Vibrator Tripped
- Wash Due
- > Overvoltage
- Mixing screw electrical current feedback
- Silos will flash on screen if a fault is active
- All alarms/faults can be filtered by region, zone or customer
- When a silo is selected, all current alarms/faults are shown
- Alarm/fault reports available



# **Engineering Continued...**

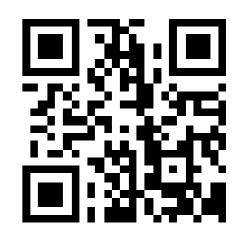
- Silo maintenance manager available to track maintenance and alarm/display warnings when maintenance is due
- Maintenance reports can be generated to view silos with maintenance overdue
- Maintenance reports can be generated to view silos with maintenance due in the coming months
- Ability to upload engineer reports and store with the silo
- Can export data to Excel



## **Site Personnell**

QR code on each box to get all silo information on Silotrak App Active alarms







# Logistics/Engineering

- > Driver can enter new delivery to web portal when on site
- Engineers can take picture of site report and upload to silo before leaving site
- > Maintenance/PPM alerts can be updated by engineers before leaving site

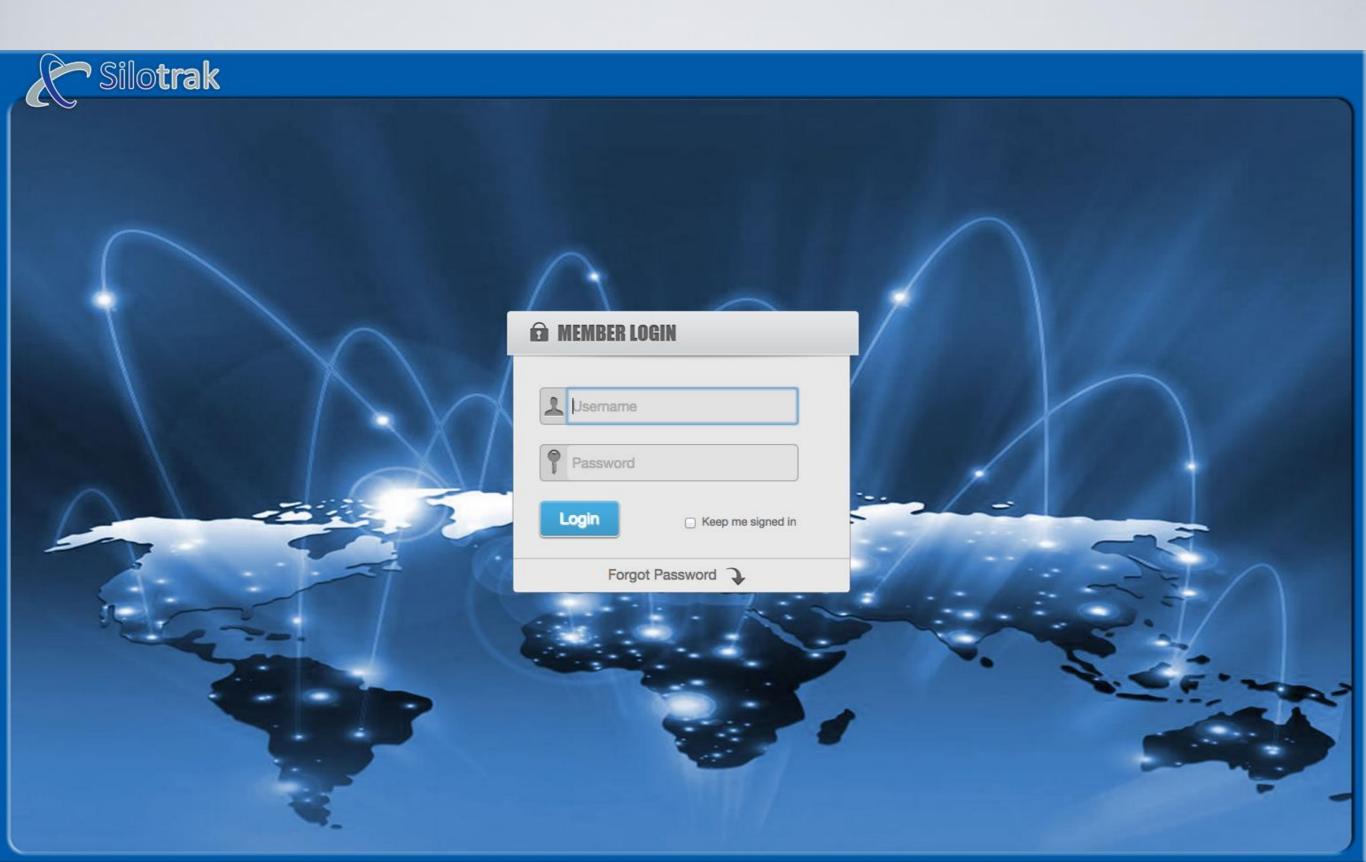




## Management

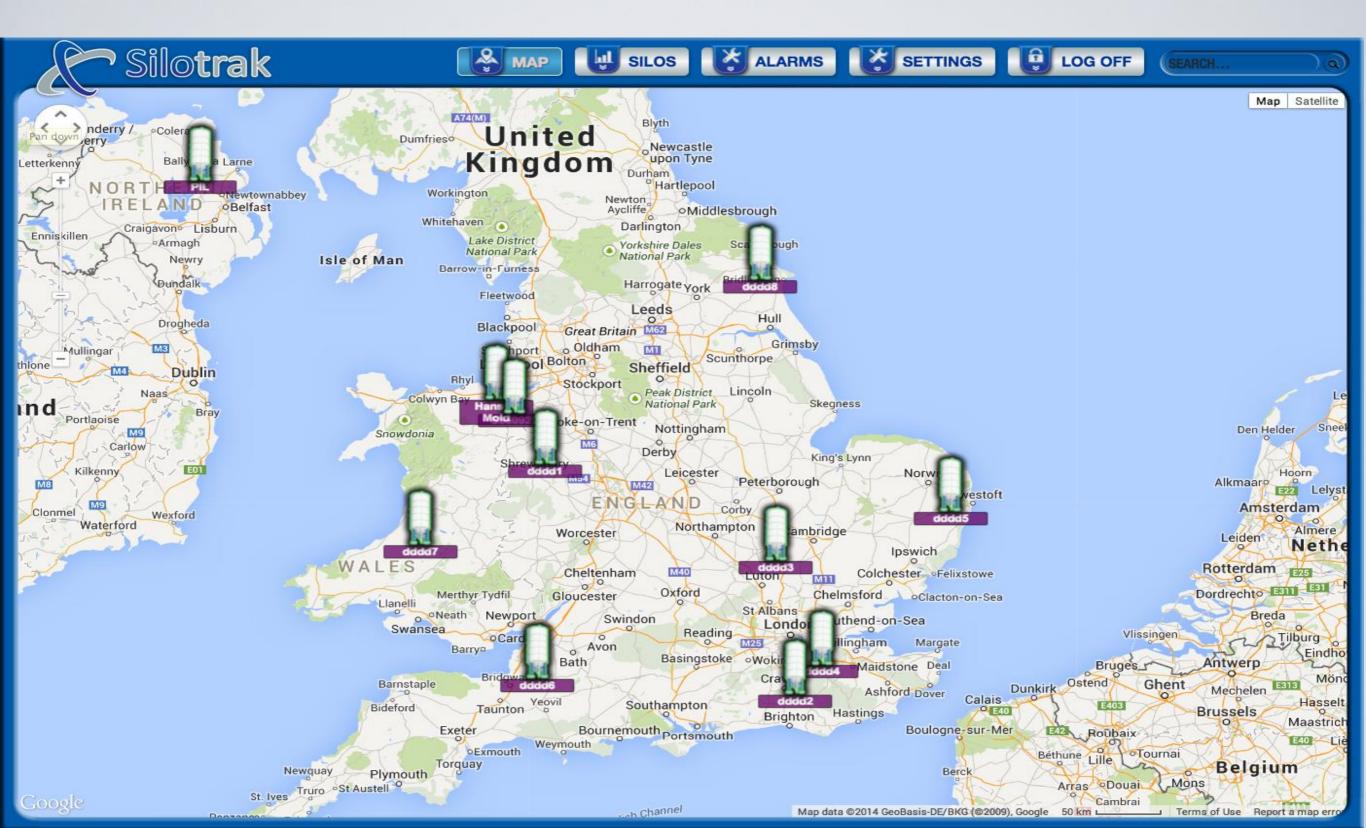
- > Ability to filter faults by customer, zone or region
- Ability to view amount of engineers time spent on site
- Ability to view list of upcoming maintenance requirements
- Ability to view stock delivery history
- Ability to view usage by customer
- Ability to export key management data to allow creation of reports, heat maps, trends etc.
- Ability to create virtual stock holding in each silo and forward order profile to the DSM plants – if our controls were in the DSM plants, this would be a completely closed loop system





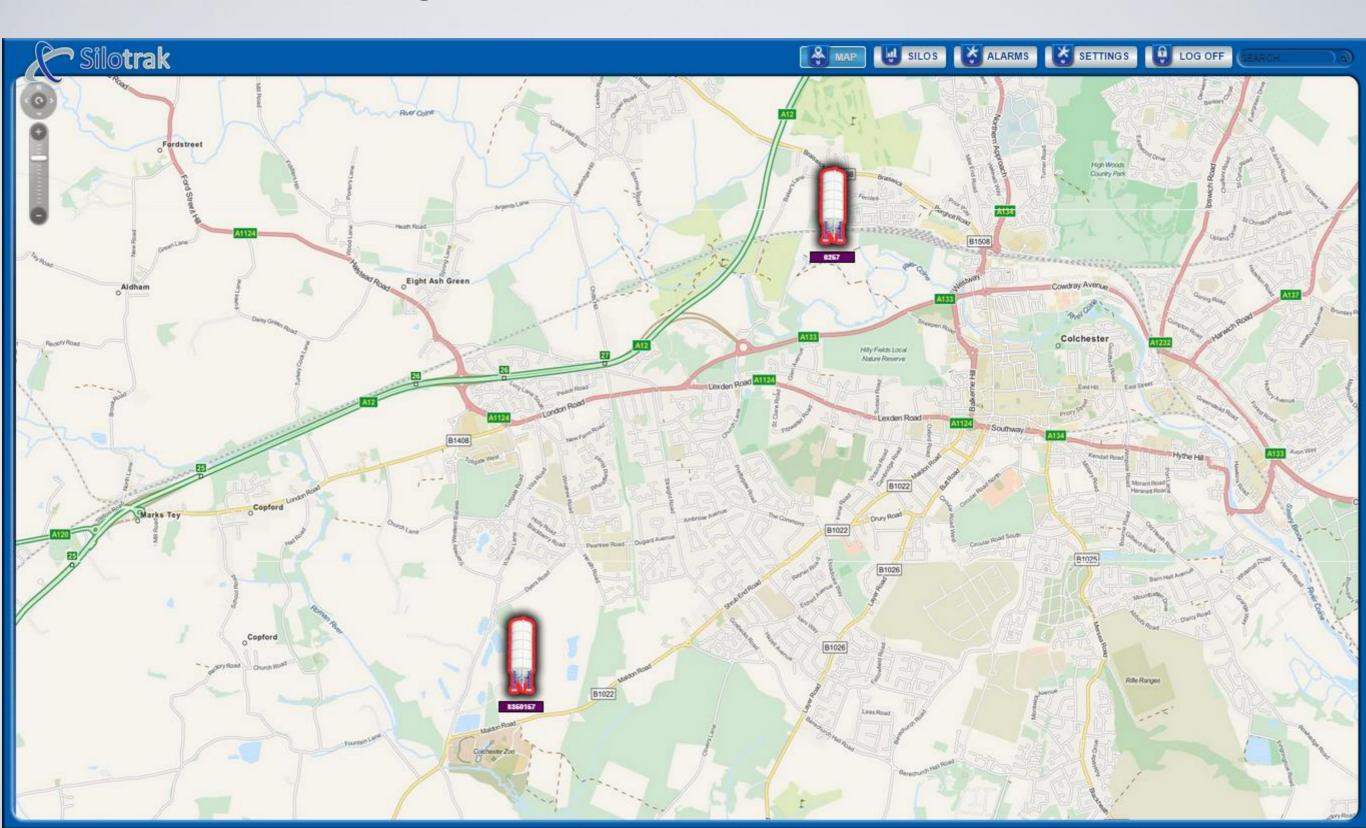


## Logistics – Map Showing Silos



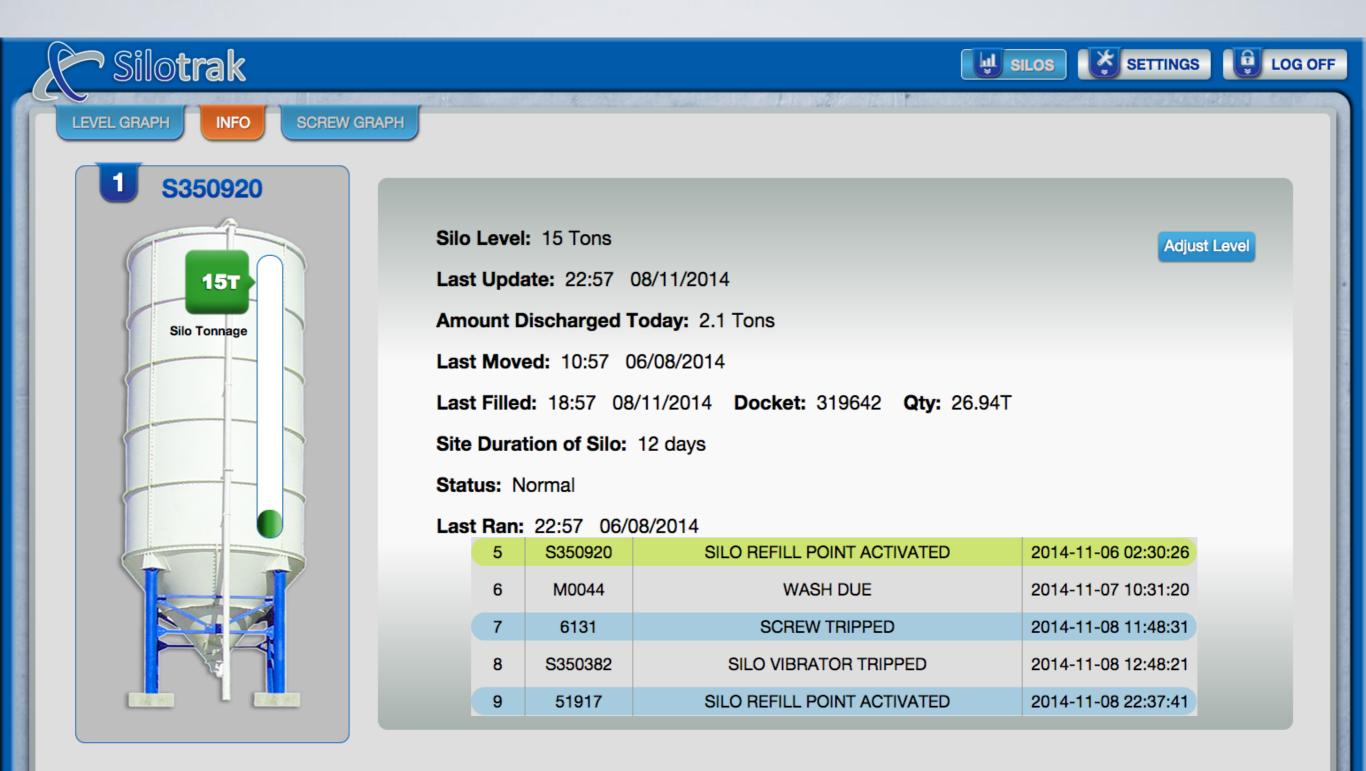


## Logistics – Zoomed in Map





## Logistics – Silo Info Screen





## Logistics – Silo Level Trend Graph

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28 -	Apr	Apr	Apr st Lev	Apr	Apr	Apr May			May	Мау	May	May May	May		May
26 -	Tuesday Apr 21	Wednesday Apr 22 Thursday Apr 23	Friday Apr 24 Adjust Level	Monday Apr 27	Tuesday Apr 28 Wednesday Apr 29	Thursday Apr 30 Friday May 01		Tuesday May 05	Wednesday May 06 Thursday May 07	Friday May 08	Monday May 11	Tuesday May 12 Wednesday May 13	Thursday May 14 Friday May 15		Monday May 18
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		Apr 22	Apr 24	Apr 26	Apr 28	Apr 30	Мау	May 04	May 06	May 08	May 10 15:14	:00, 11 May	May 14	May 16	May 18



# Engineering – Alarm/Fault List

	9 Silo <b>tra</b>	ak V									
Alarms											
ID	SiloName	Alarm Title	Alarm Location	Time							
5	S350920	SILO REFILL POINT ACTIVATED	MAW STREET, COLCHESTER	2014-11-06 02:30:26							
6	M0044	WASH DUE	CAULSIDE DRIVE ANTRIM	2014-11-07 10:31:20							
7	6131	SCREW TRIPPED	STACEY AVENUE, EDMONTON	2014-11-08 11:48:31							
8	S350382	SILO VIBRATOR TRIPPED	NORTHLAND DRIVE, ENFIELD	2014-11-08 12:48:21							
9	51917	SILO REFILL POINT ACTIVATED	HIGHBANR ROAD, LEEDS	2014-11-08 22:37:41							
10	C6967	EMERGENCY STOP PRESSED	MAIN SANK, LIVERPOOL	2014-11-09 10:30:30							



#### Engineering – Screw Amps Graph S350178 (London) - Example of Proper Screw Use





#### Engineering – Screw Amps Graph S350462 (Kent) - Example of Incorrect Screw Use

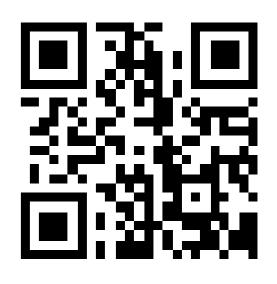




## Personnel – QR Code

- QR code can be scanned using Silotrak App
- Silo level information instantly shown
- Active alarms are shown







## Logistics – QR Code



> New delivery is added after QR Code has been scanned





## Logistics – QR Code



User enters their unique password to confirm they are authorized personnel

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## Logistics – QR Code



> Delivery details are entered and silo level is immediately updated

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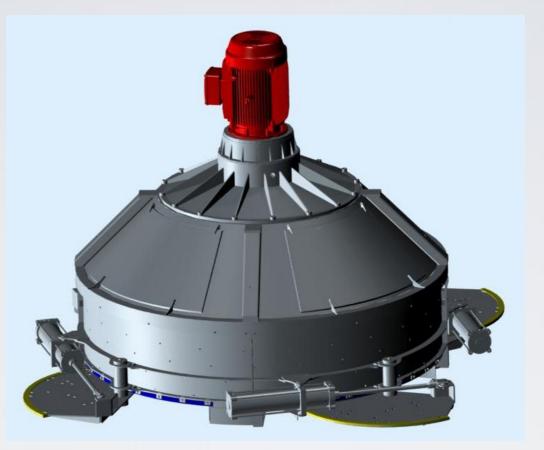


## **Overall Key Points**

- Ability to view actual level in each silo
- Silo level re-order reminders
- Actual silo delivery amount
- Actual throughput by silo
- Ability to ensure correct use of silo screw and washout procedure
- Maintenance alarms and PPM reminders
- Use of QR code to acknowledge silo has been filled, Silotrak portal to log fitter visits, technician visits and ability to upload service reports



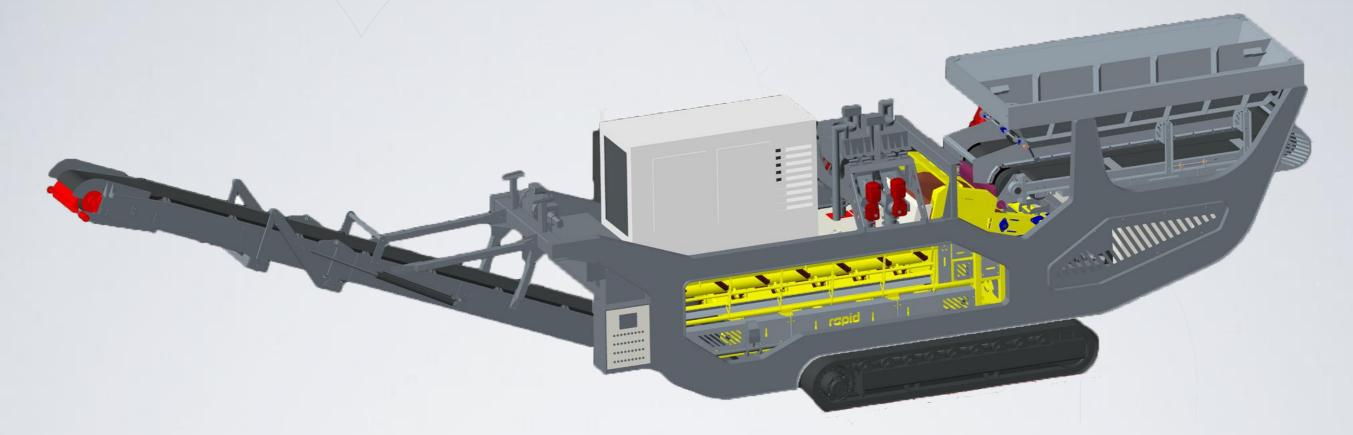
### Appendix 1 – Mixer Track



- Mixer alarms and faults communicated into web portal for remote management
- Maintenance data communicated into web portal
- Auto warnings generated when maintenance is due



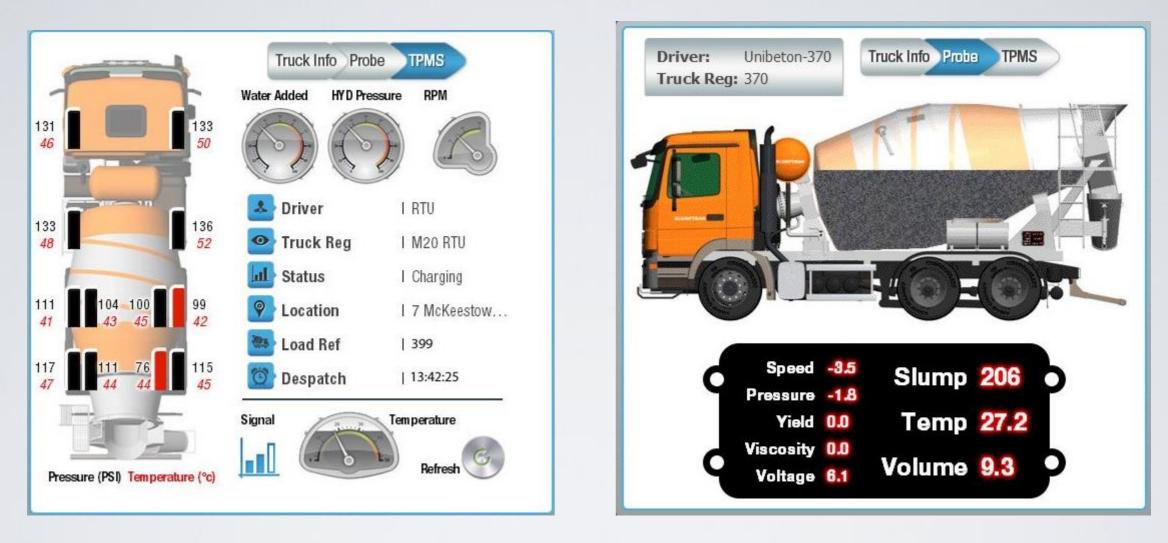
# Appendix 2 – Mobile Continuous Mixing Plant



- Generator diagnostics fuel level, oil level, maximum current output
- Mixing plant production data
- Mixing plant alarm data
- Mixing plant maintenance manager



### Appendix 3 – Slumptrak



- Tyre Pressure Management System data communicated back to the Slumptrak web portal highlighting tyre over pressure &over temperature
- Rheological properties such as slump, yield stress, viscosity, volume and concrete temperature all communicated to the web portal