Case Study 3

Byzak

Process	Preventative maintenance
Users	Plant maintenance engineers
Hardware	RFID data gathering system
Software	Tag-All Advanced
Location	Merseyside, UK
Cost	£7,400
ROI	Payback within one year

Business Problem

Byzak required a method of reliably planning and recording service and maintenance of their plant and machinery. They needed to monitor and keep records of scheduled services and information about the machinery.

The machinery needs maintenance certificates to be hired out on site. The certificates must be easy to produce, accurate and accountable.

Business Solution

A Planned Preventative Maintenance System was installed. They are using RFID (Radio Frequency Identification) tags that are stuck to the machinery to store information. All maintenance information is available (and edited) to the service engineers via a handheld Psion and synchronised to a planned maintenance database.

Background

Byzak Ltd needed a method of reliably planning service and maintenance of plant and machinery. Byzak hire out large machinery and have to keep good records of maintenance undertaken and the upkeep requirements of the machines.

Process

The record keeping, scheduling of maintenance and servicing of machinery. Previously, Byzak relied on engineers recording their work on forms whilst at the jobs, and choosing the correct form from nearly 40 different schedules. Any paperwork about maintenance and ordering of parts was done by hand. Any parts required were then ordered when they returned to the office. The logistics and scheduling were also carried out manually, leaving them open to human error and delays.

Solution

A Planned Preventative Maintenance (PPM) system was installed. Byzak are using RFID (Radio Frequency Identification) tags that are stuck to the machinery to store information. All the machinery's maintenance history and requirements, parts' details and schedules are stored on the tag.

Costs

The total implementation cost for this mobile computing solution was £7,400. The key areas of expenditure were:

- Hardware (Readers and Tags);
- Software.

Benefits

The main desired benefit has been to make it simple for the engineers to fill in the correct forms on site with all the correct scheduling and mechanical information available. Some of the plant that Byzak owns legally requires certificates of service and maintenance, before plant can be hired out to site. All the large mechanical plant is now tagged and easier to certify for hire.

As the paperwork has been taken out of the process the management and storage costs of their plant has reduced. The tags can also increase efficiency of engineers as all the history and component information is available from the tag and readable using the handhelds.

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Business Benefits

Cost

The storage costs of having a manual filing system have been removed. Very few forms are actually printed. The engineers no longer need to carry a few copies of nearly 40 different service schedules as they are chosen for them on the handhelds.

Time

The engineers no longer need to write down the maintenance services and then type it up later. Once they have inputted work into the Psion readers they can easily transfer the information to the tag and the database, without room for error or duplication of effort.

Quality

Byzak can now produce up-to-date safety certificates for all its plant at any time. The system knows when each item of plant should be serviced. The system then helps the engineers to schedule the maintenance program. This enables Byzak to provide a better service to its customers.

The engineers have always been good at filling in service report forms, however they have 30 to 40 different service forms for different machines and could easily use the wrong form. Now the tag tells the handheld which form to use so the engineer cannot fill in the wrong form.

This increased level of accountability helps Byzak to meet health and safety regulations, with large plant this means adhering to the Provision of Use of Work Firstly, Byzak identified all machinery that they wished to tag, this initially included all the machinery with a significant amount of moving parts such as engines. The software is installed onto the relevant computers and all the tagged machinery is logged onto the system. The drivers for the Psion readers are then installed on the computers so that the information can be transferred easily between the readers and the database.

The second phase consisted of training the personnel how to use the operation of the system, this covers the hardware and software as listed below.

Equipment Regulations 1998 (PUWER). Depending on the machinery being used there are also requirements from the Lifting Operations and Lifting Equipment Regulations 1998 (LOLER).

One of the requirements under PUWER is that “equipment provided for use at work is safe for use, maintained in a safe condition and, in certain circumstances, inspected to ensure that this remains the case.” The PUWER regulations go on to explain ‘suitable’, ‘maintained’ and ‘inspected’ in more details.

Return on Investment

The main savings have been through time savings for engineers, there is also likely to be an increased lifespan of plant and machinery.

Some of the tags are placed discretely and can be used to identify plant if stolen.

Champion

Mannings sales team visited Jim Matheson, Manager of Byzak, to give a demonstration of their products. He had the authority to make a decision that day to use the tags.

Implementation Team

The system was installed at Byzak by two software engineers from Mannings. The installation took the team of two engineers three days to carry out.

The implementation process is relatively simple, it consisted of two stages.

Training

Full training for using the handhelds was given to two of Byzak’s service engineers by the Mannings team, over a three day period. Training the engineers mainly covered two key areas of the system:

1. Operation of the software on the computers. Users are shown how to download data to and from the Psion readers and how to produce the reports that they need.
2. Operation of the readers. Users are shown how to record data using the reader and how to use the readers for all of the different tasks that they carry out. This was made simpler as the forms on the handhelds closely resemble the original paper forms.

Technology Usage

ID1	ID	Desc	Serial	Loc	Inst	Purp
787	30/1591B20D	MENS	GN25 250KVA		18/11/2002 16:51:51	Generator
789	30/15917336	Cummins	GNO25		27/11/2002 15:07:09	Generator
792	30/1591A28D	NCK RAPIER	CN22	PLANT Yard	03/12/2002 15:01:40	Mechanical Crane
793	30/1591A28D	NCK Andes	CN22	PLANT Yard	03/12/2002	Mechanical Crane
794	30/15917DED	JCB Stacker	CN21	Plant Yard	03/12/2002 15:56:11	Fork Truck
795	30/15918BFF	Cummins Generator	GNO24		03/12/2002 16:00:12	Fork Truck
796	30/15917F81	CAT Generator	GNO14		03/12/2002 16:04:18	Fork Truck
797	30/15917296	CAT Generator	GNO09		03/12/2002 16:07:30	Generator
798	30/15917F81	CAT Generator	GNO14		03/12/2002	Generator
799	30/15918BFF	Cummins Generator	GNO24		03/12/2002	Generator
800	30/1591A187	Ruston Bucyrus 21	CNO3		03/12/2002 16:12:34	Mechanical Crane
801	30/15919772	Senebogen 630	CNO36	Wearhead	04/12/2002 11:03:02	hydraulic Crane
802	30/1591AA91	Volvo EC21Blc	EX25	Stanhope	04/12/2002 14:20:42	Tracked Excavator
803	30/15918A2E	Volvo EC140Blc	EX24	Stanhope	04/12/2002 14:34:12	Tracked Excavator
804	30/159183AA	Mobile Senebogen	CNO39		04/12/2002 14:45:13	hydraulic Crane
805	30/159177D5	Smiths 35	CNO29		04/12/2002 14:49:10	Mechanical Crane
806	30/15917720	O K MH6pms	EX19	Rothbury	05/12/2002 10:12:37	Wheeled Excavator
808	30/15918E51	Volvo EC14Blc	EX20		05/12/2002 12:52:27	Tracked Excavator
809	30/15919725	Generator Ford	GNO4		05/12/2002 13:25:03	Generator
810	30/15917D42	Senebogen 630	CNO37		05/12/2002 16:22:07	hydraulic Crane
811	30/15918A49	Volvo EC140Blc	EX21		05/12/2002 16:35:04	Tracked Excavator
812	30/1591A92D	Volvo EC210Blc	EX22		05/12/2002 16:44:09	Tracked Excavator
813	30/15918790	Volvo EC210Blc	EX23		05/12/2002 17:39:39	Tracked Excavator
814	30/1591B12A	Perkins Generator	GNO16		05/12/2002 17:41:21	Generator
817	30/159199F8	Mobile Compresor	ARO3		17/01/2003 10:43:37	Compressor (Diesel
818	30/15919CEA	Iveco Generator	GNO2	Trimdon	23/01/2003 11:00:25	Generator
819	30/159191C6	Iveco Generator	GNO1		23/01/2003 15:14:16	Generator
820	30/1591AF3B	Senebogen HPC40	CN39	288	29/01/2003 09:42:23	hydraulic Crane

Team tasks

The engineers receive their maintenance schedule from the office. On site the engineer scans a tag attached to the piece of plant, which shows the list of checks that are needed on the plant. The engineer then makes notes about parts, repairs or rescheduled services. This information is then taken back to the office and placed onto the company reporting system.

Technology usage

The technology is used to hold the data about a piece of machinery on the machine. To give the engineer all the information they need and to enable accurate reporting of maintenance.

The software is used to organise the engineers and the reports and to communicate between the Psion and the database. The data is gathered into company and service reports.

Why employ this technology?

RFID is used mainly for accountability. Byzak can now use the database to print accurate maintenance certificates under health and safety regulations that are now needed before plant is hired out.

The old system relied on the engineers remembering what tasks had been completed and transferring this to the office accurately on paper, or by memory if the sheets were lost or damaged by the weather.

Implementation Costs

How much did it cost to implement this solution?

Description	Notes	Cost
Up front investigation costs	Replied to a mail shot to request a free demonstration	Half a day to attend demonstration of the handhelds, the tags and the database.
The mobile computing devices	Two Psion Read / Write Tag Readers	£3,122
The software application	'Off the shelf' customised from Mannings to meet Byzak's needs	£500
The communications infrastructure	£735 for 300 tags. Plus one standard desktop pc	£1,850
The data storage system	Byzak's existing IT equipment, (the pc listed above)	£0
Consultancy service costs	One update since installation	£400
Site installation costs	Byzak software engineers and training costs together	£900
Personnel training costs	Time cost of two days of two service engineers	£600
Staff costs	Middle management and service engineers over three days	£Unknown
Support costs	Ongoing	Negligible so far…
Other costs	Six months of on-site support included in purchase	£0
Total		£7,372

Costs

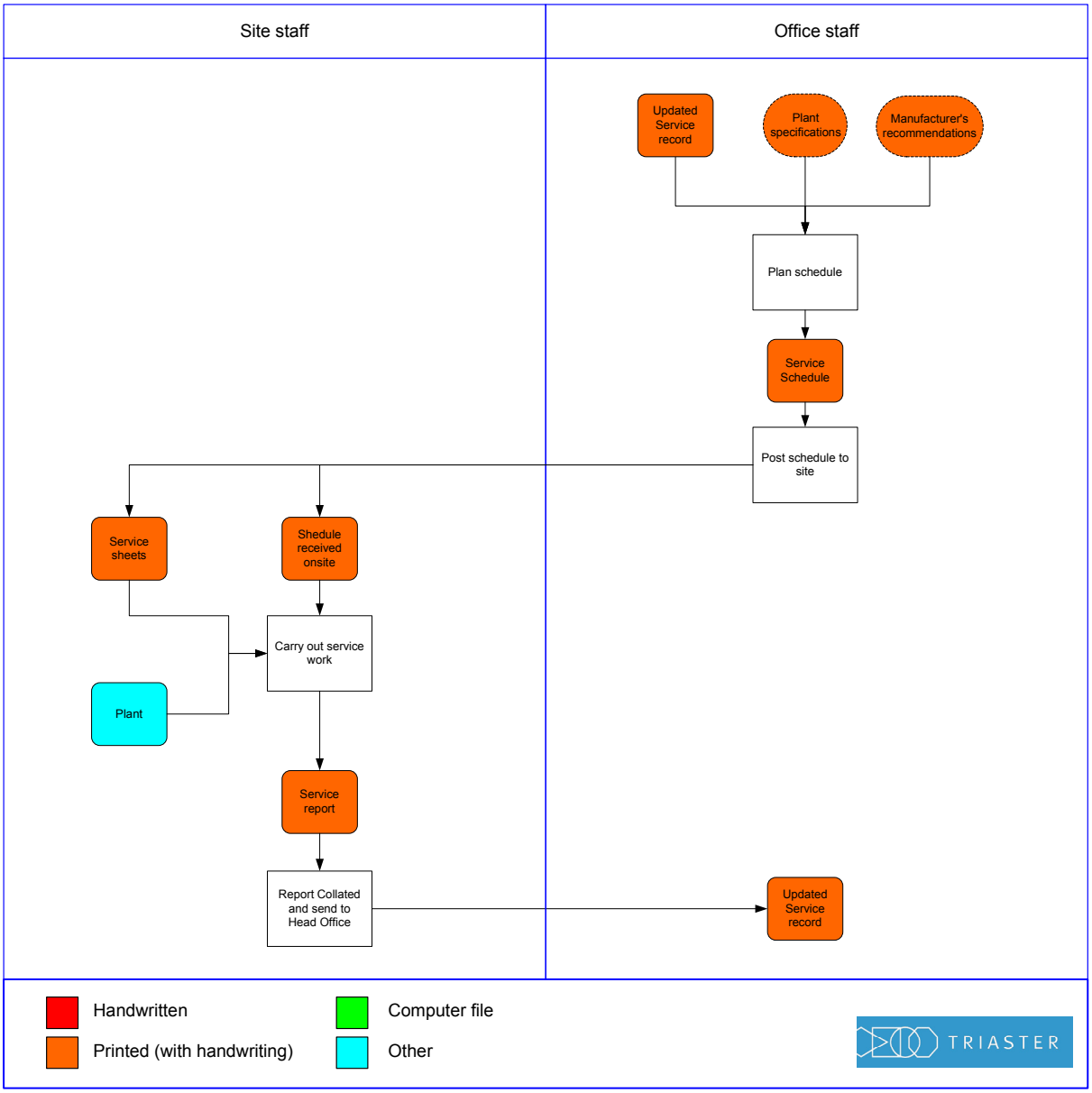
The main costs are the handhelds, the many tags and the software. As the software is designed to be user friendly the installation and training are relatively cheap.

Implementation Timescale

The implementation process is relatively simple, it consisted of two stages over three days.

Byzak identified all machinery that they wished to tag. The software is installed onto the relevant computers and all the tagged machinery is logged onto the system. The software and hardware is then installed and data transferral is checked between the readers and the database.

The second phase consisted of training of the operation of the system; this covered the hardware and software.



Original Business Process

Previously Byzak's engineers kept records by filling in forms by hand either on site or after they returned to the office. Forms filled out in the field are easily damaged or lost or the wrong form to start with. Filled in forms are then typed into the computer database at head office. This was not ideal as the people who use the computer are busy carrying out maintenance on plant at head office, which is their main obligation.

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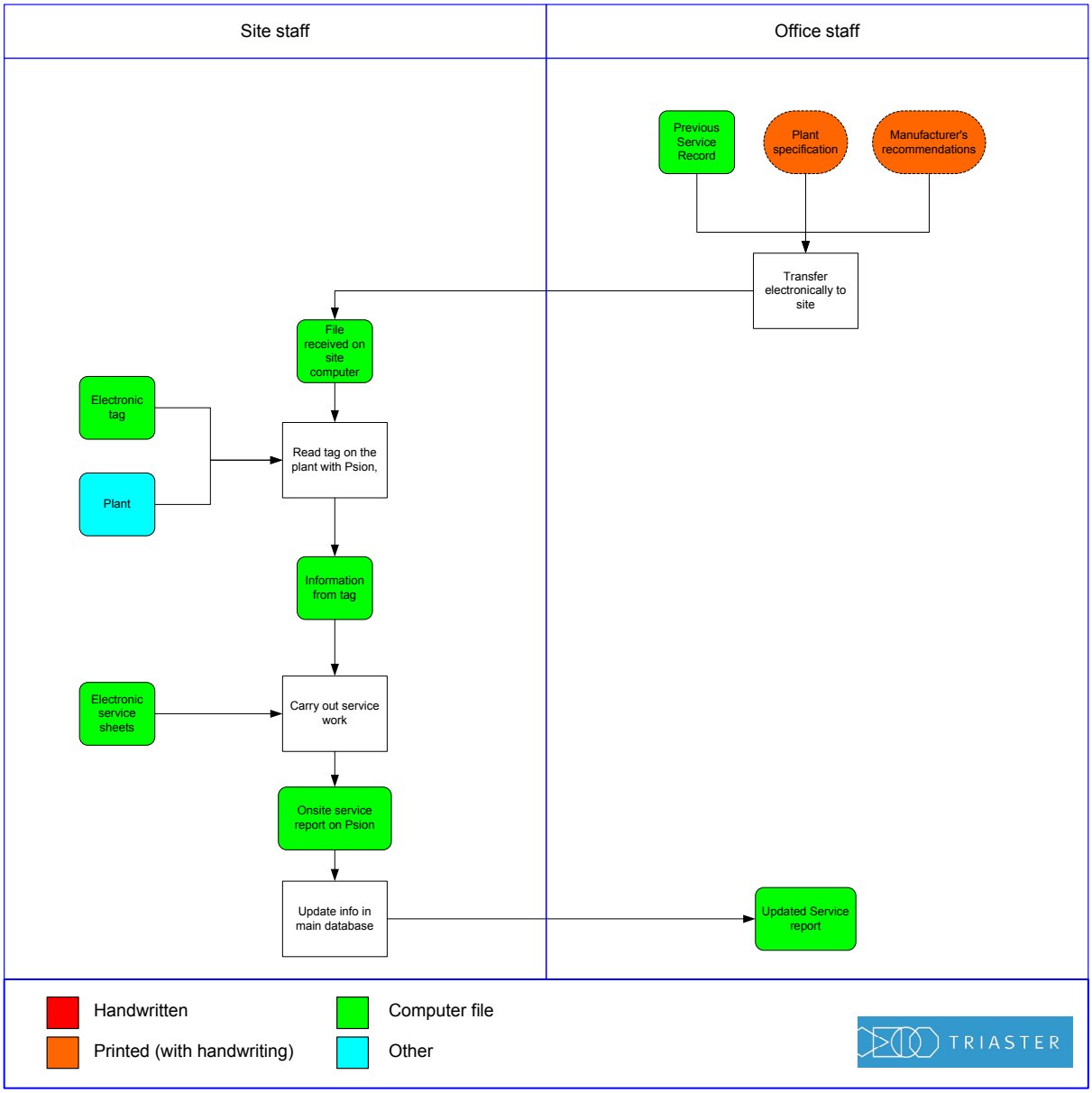

New Business Process

Each engineer is given a reader and a tag unique to them. Before they go on site they use the tag to log onto the system and register work that is logged against that engineer. On site the engineer scans a tag attached to the piece of plant, which shows the list of checks that are needed on the plant. The engineer then makes notes about parts, repairs or rescheduled services.

Once back in the office the engineer downloads the data (by placing the handheld into its stand) onto a database provided by Mannings, which produces reports for ordering parts, maintenance schedules and the certificates for hired equipment on site. The database also produces the service history of each tagged asset.

Lessons Learnt

People

The simplicity of the system facilitated acceptance by the service engineers. The old paper forms were transferred to tick boxes with areas for comment on the handhelds and reports look exactly the same when printed. This similarity made using the system very fast to learn for the engineers. Mannings have learnt from this experience to make all their user interfaces as user friendly and simple as possible.

After Byzak described the system that they wanted the Mannings team delivered the software. They then had to talk to each other to discuss the discrepancies between the communications of what was needed. As this was a new system both companies carried some of the costs and are now happy with the outcome.

Process

Byzak now have the option of printing out the maintenance reports instead of having all the forms ready in a filing cabinet. They are finding that very little actually needs to be printed.

The list of tick boxes on the handhelds has made it easier for engineers to ask the right questions. It has been important that they can print forms that look the same as the original papers versions when they want a report.

Technology

The original off the shelf system that automatically updated records did not allow manual updates. Manual updates were asked for by Byzak and are now allowed, this has increased the functionality of the system. Automatic updates are used for the vast amount of the time but the facility to update records manually was needed.

The collection of data is fully automated. All the data related to a piece of plant is held on the tag, so that it is always available when a service engineer is on-site with a reader.

The system runs with few failures and very little maintenance, this is because of the simplicity of the design.

What Next?

Byzak intend to increase the size of the database and include all their plant at the Burscough site. They started with about 60 of the more complex mechanical plant which require regular maintenance and are covered by regulations.

Mannings are looking at a RFID tagging system with handheld readers that can send the information back to the office like a mobile phone as well as read/write the tags. The new readers have WAP, GPS and GPRS capabilities.

Details for further investigation

User:

Byzak
[plant@byzak.co.uk]
[www.byzak.co.uk]

Software and hardware sourcing:

Richard Harrison, Mannings (Southport) Ltd
[richard@mannings.uk.com]
[www.manningsitc.uk.com]

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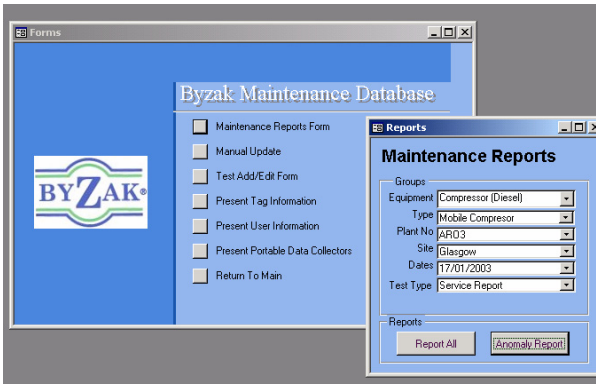
Technology Overview

Mobile computing device

The handheld devices are all Psion. Rugged and lightweight for industrial applications they are weather proof and shock resistant. They are fitted with a backup battery and have a simple alpha numeric keypad, with a backlit display. The docking station provides the communication and RS 232 charging. They use 2x AA alkaline, Nicad or NiMH batteries. Memory and processing speeds are improving with each new model.



Software application

Planned Preventative Maintenance is a data collection system. It is usually used with RFID read/write tags. ID's cannot be fed into the system unless the reader has read the tag. Data is recorded against the operator ID and all data is dated for audits. The system is designed for little keying to be needed for data collection by the manager, health & safety, quality control and Legal departments.

Communications infrastructure

Read/write tags are robust for site usage, resistant to UV, water, mild chemical solutions and temperatures up to 90°c for 1000hrs or 130°c for 100hrs. The tags can be read even if they are covered or painted over. The tags have to be within 70mm of the readers for good data transfer.
They have a memory of 256 bytes.
Tag diameter of 50, 30 or 20mm
Tag thickness of 1.5mm

COMIT

Construction Opportunities for Mobile IT

The COMIT Project

COMIT, Construction Opportunities for Mobile IT, is a two-year research and development project part-funded by the Department of Trade and Industry. Led by Arup, in partnership with BSRIA and Loughborough University, the project brings together representatives from construction, technology, research and dissemination organisations to facilitate the realisation of business benefits from the adoption of mobile information and communication technologies.

Key Objectives

- Creation and running of the COMIT community.
- Mapping of information and communication needs of point-of-activity workers.
- Production of case study material, including detailed factual business benefits and implementation guidance.
- Implementation of mobile IT on two demonstration projects, in order to evaluate the benefits and barriers successes and failures.
- Continuation of the development of community activities in conjunction with the ITCF.

COMIT Case Studies

This report provides an overview of the use of mobile communication technologies on a construction project. It is one of a series of case studies that have been conducted as part of the COMIT project to show real examples of implemented applications.

The case studies illustrate several mobile technologies and how the companies have improved work processes. An overview is given of vital information such as who championed the changes, how much they cost and what business improvements were gained. To gain a full insight, both the staff using the technologies and their managers were interviewed.

How do I find out more?

In addition to the contact details provided in this case study you can use the ***Information hub*** available on the COMIT website (www.comitproject.org.uk). The relevant details can be found by selecting:

Process	Asset management
User	Maintenance engineers
Software	Data capture
Hardware	Palmtop/PDA
Infrastructure	Barcoding/RFID

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Construction Opportunities for Mobile IT

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