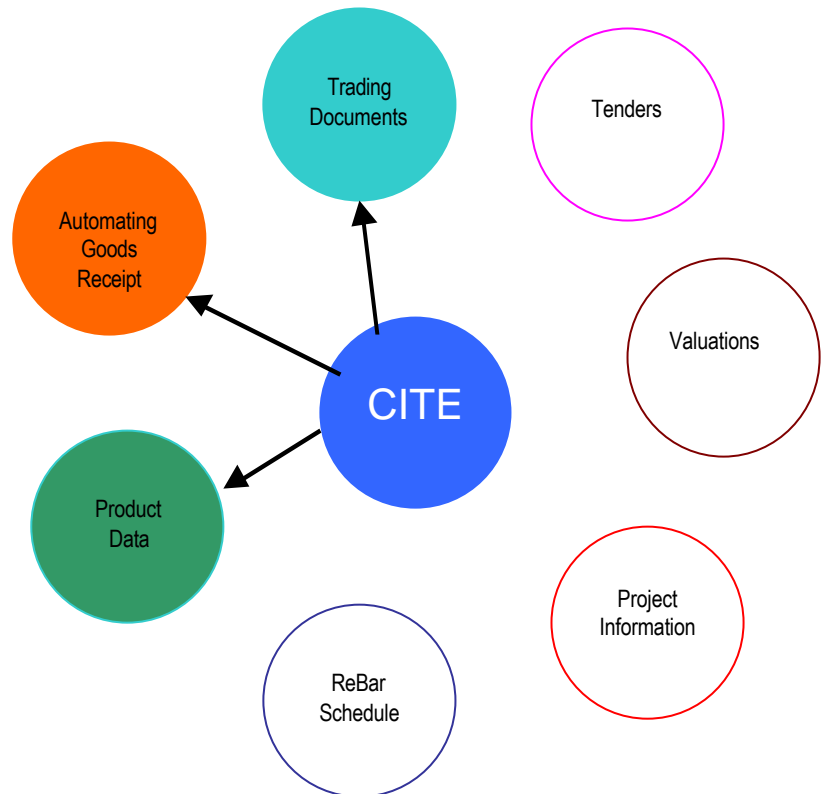


e-Business

Case Study – CITE Exchange Standard Support Goods Receipt Automation and Product Tagging



Those who will be interested in this Case Study

The projects undertaken in this case study will be of benefit to senior managers who are looking for cost effective methods of dealing automatically with the receipt of goods and the identification of stocks of materials.

The trials instigated by Bovis Lend Lease, proved that automation of systems using new technology does achieve the envisaged efficiency savings, but was only the first step towards process re-engineering and the realisation of even greater savings.

Three of the CITE exchange standards were adopted for the trials:-

●Automating Goods Receipt ●Product Data ●Trading Documents

To be read in conjunction with this case study there is an e-Business Implementation Guide. The guide provides further information about bar coding, available technologies and the various business processes that can be adopted alongside the recording of goods receipt, in order that even greater benefits may be derived from implementing e-business.

The Centre for e-Business in Construction

CITE

The Bovis Lend Lease Projects

Project 1 Data Tagging for Maintenance of Plant

Project Leaders – Laurence Marsh and Mike Chorley

At Calderdale hospital, Radio Frequency data tagging has been used to improve the 30-year maintenance programme, by replacing the traditional paper systems used for maintenance management, with data tags and hand held computers that record all planned and reactive maintenance. Data tags are fixed to items of plant and machinery and provide immediate access to key information.

The development partners:-

Hardware/Software Consultant

Industrial Auto ID Ltd

Project 2 Bar Coding System for Material Delivery Recording

Project Leaders - Laurence Marsh and Nigel Grace

Bovis Lend Lease chose the development of a Safeway store at Stratford in order to demonstrate:-

The potential use of bar coding for material delivery recording

Bovis were aware that the retail trade has for many years enjoyed the benefits of bar code technology as a means of capturing data and felt sure that the process of receiving merchandise in construction and retail was very similar. Both require items to be delivered to the place of business at the right time and at the right price. The retail industry is the leader in logistics, and entire system processes are computer driven – no written orders, delivery notes or invoices. Bovis believed that there was much to learn from the way in which the retail sector operates its business and so chose the brickwork package on the Stratford site as the test bed for the trial.

Project 3 Data Tagging Pallets for Material Recognition

Project Leaders - Laurence Marsh and Nigel Grace

Bovis Lend Lease again chose the development of a Safeway store at Stratford in order to demonstrate:-

Radio Frequency (RF) Data tagging of pallets for material recognition

A method of attaching Data tags (iTags) onto pallets on the Stratford site was developed from the bar coding project (Project Number 2) and was in direct response from problems raised by works contractors and suppliers in relation to locating the correct material on site. It was envisaged that implementation of a data tagging system would minimise the possibility of these problems occurring.

The development partners for projects 2 and 3:-

Brickwork Works Contractor

Brick Manufacturer

Brick Factor

Hardware/Software Consultant

Lesterose Builders Ltd

Ibstock Brick Ltd

N R Taylor Ltd

Industrial Auto ID Ltd



The Process

Step 1 Each item of plant and machinery at Calderdale PFI Hospital was fitted with a data tag containing all the necessary information about the item and its service history.

Step 2 The maintenance engineers used hand held computers that had the ability to read data tags and which had been downloaded from a central database with Maintenance Orders. The data tags interfaced with existing Maintenance Database systems for both planned and help-desk maintenance activities.

Step 3 Prior to maintenance activity being carried out, the engineer scanned the data tag affixed to the asset, establishing identity and historical maintenance details.

Step 4 When the maintenance work had been completed the data tag was updated with details of work undertaken and any components that were used.

Step 5 At the end of each shift the completed Maintenance Orders were uploaded automatically to the central database and signed off as complete.

The Benefits

ONE Using data tags increases productivity by providing engineers with instant access to maintenance history, equipment setting and other essential information.

TWO Because a data tag is affixed to every item of plant and contains an up-to-date record of maintenance undertaken, using a hand held computer that has the ability to read data tags, a Facilities Manager or Client can carry out random audits.

THREE By fully automating the information collection process, data tagging allows the compilation of a component life database.

FOUR Data tagging provides accurate productivity information, allowing reasons for delays and resource consumption to be recorded, when data has been uploaded into the central maintenance database.

FIVE As a direct result of the automated process removing the generation of **all** paperwork, overall maintenance management costs on this project can be reduced by about 2.5% when utilising a data tagging system.

The system was set up to capture delivery information by scanning a bar code displayed on the suppliers' delivery ticket. The sequence of events is very similar to traditional manual systems, except that the operation of signing a delivery ticket is replaced by the scanning of a bar code and, the posting of the signed delivery ticket to the purchasers head office and supplier is replaced by an e.mail message.

The Process

Step 1

Bricks are delivered to the site in the traditional way.

Step 2

A delivery ticket is presented to the recipient of the materials. The ticket displays the normal information but with the addition of a barcode, (containing a replica of the data printed on the ticket), that is printed in accordance with the EAN-128 specification. This is identified in the CITE Standard – Automation of Goods Receipt Processing Standard V1.0.

Step 3

Using a hand held computer complete with bar code reader, the individual receiving the materials scans the bar code and when prompted, proceeds through each line of the delivery and confirms with one of two keystrokes that the materials are accepted or not.

Step 4

The hand held computer is returned to the site office, where it is placed in a docking station that is attached to a PC and modem. The process results in the transmission of an e.mail to the parties concerned confirming delivery and the order status.



The Issue - Stonework is delivered to site on pallets and once on site the bricklayer or stone mason has to search through each pallet until a piece of stone of the correct length (e.g. 700mm long) is found. Upon attempting to use the stone, if it is found to be the wrong length (e.g. 720mm long), instead of returning it to the stock pile and exchanging it for one of the correct length, the bricklayer will often cut the piece of stone to the actual length required, causing two problems:-

Problem 1 - There is a piece of stone 700mm long in the stock pile which is too short, as the 720mm piece has already been used incorrectly elsewhere.

Problem 2 - The supplier is requested at short notice to make another piece 720mm long.

This will undoubtedly be more expensive to manufacture, there may be a problem with colour matching due to different batches and there could be delays to the project if the supplier does not act quickly to replace the stone.

The Process

Step 1 – The supplier attaches a printed label to each piece of stone, providing details of stone type, drawing reference and location.

Step 2 – The stones are palletised according to a packing list that is produced using Microsoft Excel.

Step 3 - The supplier fixes onto each pallet a Radio Frequency Data Tag containing an electronic copy of the Excel packing list. The pallet is delivered to site.

Step 4 - Using a hand held computer that is equipped with an RF Data Reader, when a bricklayer requires a particular piece of stone he/she can very quickly scan each pallet by simply touching the data tag affixed to the pallet. The computer display indicates whether or not the pallet being scanned contains the size and type of stone required for the job.

Step 5 – When the correct pallet is scanned and the computer display indicates that the piece of stone required is contained within it, the bricklayer manually selects the stone from that pallet.



The Benefits and Successes of the Trial

This particular project realised immediate benefits and efficiency savings, together with a potential reduction in waste and project delays. By using the product tagging method the trial proved that quick and accurate identification of material saves project time. Without the use of this product tagging system, the case study found that a bricklayer can spend upwards of one hour searching for the correct piece of stone, therefore savings in both cost and productivity easily outweigh the initial capital expenditure. In addition, having the ability to scan the tags provides more information about the pallet deliveries and Material Management on site saved up to 5% of material costs and dramatically cut time and wastage.

Potential Drawbacks

It was a concern that the tags, unless securely fixed to the pallets, would become detached and that data would be lost. To ensure that this did not happen (and it didn't), the tags were screwed to the pallets.

The Benefits of Using Bar Coded Despatch Notes

Complete Accountability – you can only use the system if you have an electronic key and password. This therefore will ensure that each delivery receipt can be traced back to the individual who received it – no more ‘whose signature is that?’

Lost Delivery Notes – the information is captured once and stored electronically. The possibility of delivery notes being lost on site and not returned to the head office is dramatically reduced, as it is more natural to place the handheld computer back into the docking station for data upload.

Increased Efficiency – Less Waste – by capturing the information once at the point of delivery.

A conservative estimate is that 10% of invoices are disputed, usually revolving around differences in items on delivery tickets or whether the materials were actually received. Bar coding delivery tickets significantly reduces these disputes, which are very time consuming and often involve the site-based construction team. A reduction in the number of disputes will have a large effect on waste cost.

Reduced Payment Cycles – automatic information processing enables faster payment, in particular due to the eradication of the problems of accountability and lost delivery notes.

Financial Gain – The combined site and office process of dealing with deliveries and invoices was measured at 45 minutes per transaction.

The bar code method reduces this time to just 10 minutes.

Therefore there is a potential 77% saving on administration costs.

The Successes of the Trial

The trial proved conclusively that the system works and envisaged efficiency savings can be realised - but this is only the first stage in process re-engineering. To capitalise on even greater savings, integration of the bar code system into the overall e-business scenario, i.e. electronic ordering, invoicing and payments, would be the next positive steps forwards.

The Drawbacks Encountered

Hardware Failure

There were a number of problems using the hand held computer, most of them stemming from the back-up battery not holding its charge and the unit shutting down. This then required the reloading of the operating software. This problem has since been resolved.

Reluctance to Change

Whilst the Istock brick manufacturers had become aware of the advantages of the system, in particular to stock management, ‘on site’ personnel showed a particular reluctance to move away from running their traditional manual system.



Bovis Lend Lease Wins Award for IT Innovation

Dr Laurence Marsh is seen here with David Nunn Editor in Chief of Contract Journal (left) accepting the award on behalf of Bovis Lend Lease from the sponsor Pat Morgan Divisional MD of Ramesys for his work with the iTag product.



The implementation cost of each of the three projects was relatively small in comparison to the benefits that are to be realised

Project 1

Data Tagging for Maintenance of Plant

One handheld computer
Fitted with RF Data Reader and installed with software £1,700

RF Data Tags
at £1.50 - £2.00 each

The system was connected to existing site computer, modem and ISDN lines

Project 2

Bar Coding for Material Deliveries

Two handheld computers
Fitted with bar code reader and installed with software £3,400

Training site staff £1,000
Total Cost £4,400

The hand held computers were connected to existing site computer system and ISDN lines. There was no expenditure for producing bar codes. Most commonly used accountancy packages, used to produce delivery notes, have an option to print bar codes.

Project 3

Data Tagging Pallets for Material Recognition

Twelve handheld computer kits fitted with RF Data Reader and installed with software

10,000 RF Data Tags

**Total Cost
£40,000.00**

The capital cost of hand held computer kits can be spread across other construction projects where they will be re-used.

CITE Data Exchange Standards and Future Developments

Automation of Goods Receipt Standard

A single bar code on a despatch note provides for a link between ordering, delivery and payment information. The customer as well as the supplier can use the bar code, which is printed by the supplier onto the delivery note, to support automated data processing.

Each company will be able to decide how best to streamline their systems using this standard, which is designed to improve traditional site based material processing, as well as to facilitate the complete re-engineering of the procurement process.

iTag Standard and Future Developments

A data exchange standard for iTags is currently being designed. Dr Laurence Marsh has developed a data storage structure for iTag that is XML and conforms to the CITE Product Data XML schema in an abridged format.

This XML data can be transformed, using software being developed by the Bovis team, into the full CITE Product data XML structure for uploading data to asset management systems, accounting systems or onto the world wide web for access and processing across the Internet.

Trials are underway for the abridged iTag XML data structure, and roll out plans are already being composed for both facilities management and construction industry projects. Bovis have stated that they are committed to using the CITE XML standard for Product Data for all future developments.

Raising Awareness of e-Business in Construction (A Partners in Innovation Project)

The key objectives of the project are:-

- to increase the use of electronic business practices within construction
- to ensure that those involved in the implementation of e-business are aware of the existing electronic exchange services and opportunities available

This DETR project will provide specific information, which includes a series of Case Studies such as this one, to inform and support those responsible for implementing e-business and all outputs are additional to the core activities of CITE.

As well as delivering regional seminars aimed at raising awareness, an interactive CITE web site contains details of these and the many CITE support services available to its members and the wider industry. Project details are also available through the Information Technology Construction Best Practice Programme (ITCBP).

Web site: www.itcbp.org.uk

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Obtain help and guidance from CITE – The Centre for e-Business in Construction

The Construction industry Trading Electronically (CITE) initiative, is a collaborative electronic exchange service for the UK construction industry. When they begin exchanging electronic information, CITE members are informed of what is available to develop a company e-business strategy, given access to the Document Exchange Standards and, if required, purpose designed software, training services and company specific support.

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