

Task allocation

Users	Foreman & operatives
Location	On site
Solutions	Few
User benefits	Medium
Org. benefits	Medium
Implementation	Medium



Process description

This process is concerned with the direct instruction to the operatives on site and the feedback loop used to inform the site engineers of progress made.

The project programme is used to determine which tasks need to be undertaken. The site or senior engineer is then responsible for drafting a method statement which details the required equipment, permits, and labour force required; the sequence of works to be undertaken and the risk assessment. This is then given to the foreman responsible and he is required to brief the operatives who will undertake the work. The gang and the foreman then sign the method statement as a mark of understanding. As the work is undertaken the foreman reports progress made to the site engineer who then complete the progress sheets as detailed in "P2 Monitoring progress".

Background

This process is a sub-process of "P2 Monitoring progress". It details how tasks and the required information are delivered to the operatives in order for them to undertake the work required.

Every activity on site has to have an accompanying Method Statement. These are developed in order to provide a clear statement of the methods to be employed in carrying out a defined task or series of related tasks. They take account of the specific risks, the preventative and protective measures required, plant and equipment, emergency procedures, resources including induction and training, permits, inspections and tests required to ensure the quality of the product and the safety of all associated with the activity.

There is a huge amount of information being distributed to the operatives via the foreman, with method statements potentially more than 20 pages in length. This is predominantly a paper-based process as the operatives need to have a copy to refer to in the field.

In order to satisfy health and safety requirements the operatives are required to sign to say they have

received the briefing and this information has to be recorded centrally.

Current issues

The following issues have been raised for this process:

- With one foreman in responsible for many tasks and operatives the amount of paper he is required to carry around in his truck is substantial.
- Delivery of paper forms back to the site office to record briefings undertaken is liable to lead to omissions through the paper form being lost or mislaid.
- With the amounts of method statements being created weekly on a reasonable sized site this constitutes a large administration and storage task.
- The method statements in paper-based format are difficult to search quickly in order to retrieve the required information.

Mobile solutions

There are three distinct areas in this process that mobile technologies can be used to address; the delivery of method statements to the field, capture of briefing acknowledgements using signatures, and capture of progress information.

Delivery of method statements to site

Method statements and the associated information required could be delivered directly to the relevant foreman on a PDA. Method statement would have to be created in such a way as to take advantage of being on a PDA. Advantage of delivering this in an electronic format should be taken by restructuring the method statement for ease of use. Tabbed sections could be used, a search tool incorporated and hyperlinks to other relevant information e.g. drawings could be provided.

The method statements could be synchronised onto the PDA at the start of the day through a docking station, however, it would be preferable for the foreman to be able to download the method statement he requires whilst in the field using WLAN or GPRS.

A web-based method statement creation tool would have to be provided to the site engineers such that they can quickly add method statements for new tasks or update current method statements as new details become apparent.

The operatives' gang leader could be provided with a 'dumb' Tablet PC to access the method statement and associated information via WLAN when required e.g. drawings.

Capture of briefing acknowledgements

A simple register of acknowledgement could be provided on the foreman's PDA. A dropdown of operatives' names could be selected from and then each operative could sign against their name on the PDA. The data from the form could then be synchronised via WLAN to a central database that records briefing acknowledgements. Updates could be notified to those people that request it e.g. the health and safety manager.

Capture of progress information

The foreman could be provided with the same PDA form for capturing progress made as is provided to the

site engineer in "P2 Monitoring progress". The foreman can then fill this in and the site engineer is then required to check and add to this information prior to it being submitted to the progress database.

Benefits of mobilisation

Providing the foreman with electronic method statements eliminates a substantial amount of paper that he/she currently has to carry around in his/her truck.

He/she is able to retrieve, at the touch of a button, the relevant method statement for the task he is reviewing rather than have to search through the paperwork he is carrying around or return to the site office to collect the information required.

The method statement can be linked to other relevant information (e.g. drawings) so that everything is available through one interface.

Signatures given for acknowledging the briefings can be captured and recorded in the database immediately reducing the time delay required for the foreman to return the signed forms and eliminating the issues associated with missing signature through lost paperwork.

Capturing progress information directly in the field provides contemporaneous information, eliminating errors typing up information from handwritten notes or from memory. It also allows the foreman to spend more time out on site undertaking work that enables the project to be completed on time and on budget. The foreman's updates on progress will enable the site engineer to identify issues early and hopefully get the task back on track.

Ease of implementation

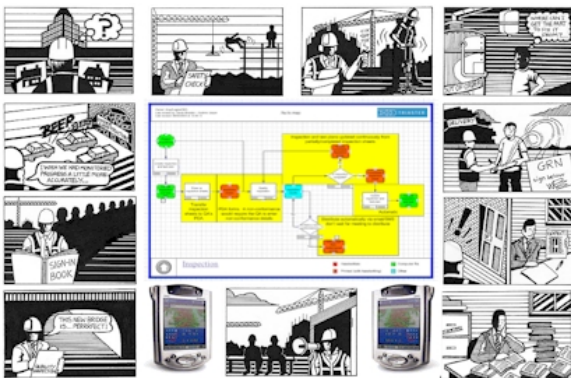
Delivering the method statement and the register of acknowledgement to the PDA is relatively simple and there are many packages available. Initially they could have the same appearance as the current paper forms thus providing the user with a familiar interface.

Provision of tablet PCs to gang leaders would be a fairly expensive solution, but would eliminate entirely the need for paper method statements. There would also be an issue of trust involved as the operatives are currently perceived as less likely to look after equipment.

Process improvement through the introduction of Mobile IT

Accompanies To-Be map
As-Is map
Narrative

Available from www.comitproject.org.uk



Summary

The construction industry's drive towards utilising IT to enhance communication both within a company and between clients, consultants, suppliers, subcontractors and contractors has, to date, ignored the need to deliver information effectively to mobile personnel e.g. whilst on site or attending a client meeting.

The advent of suitable devices and software solutions will go some way to correct this. However, simply because the technology is now available we should not be indiscriminate in choosing the processes to apply it to.

This report documents the activities undertaken to better understand which construction processes would derive most benefit from the application of mobile information and communication technologies.

Introduction

An initial review of existing research and applications of mobile IT in construction was undertaken; The Current Status of Mobile IT. You can download this report from www.comitproject.org.uk.

The COMIT community, 30 representatives from the construction and technology industries, were then presented with a list, derived from previous research, of processes that Mobile IT could improve.

Ten processes were chosen to look at in detail in order to determine which processes would benefit from the introduction of Mobile IT. These were:

- Drawing distribution and usage
- Monitoring progress
- Monitoring health and safety on site
- Quality inspections
- Task allocation
- Goods received notes
- Site design problem resolution
- Site diaries
- Onsite accounting of operatives/visitors
- Maintenance inspections

In addition, one of the partners requested that monitoring of hazardous activities was also researched as new legislation, recently introduced by the HSE, has brought about a new requirement to monitor and record this process.

Generating the process maps

Process maps were produced to show how the processes occur currently; the "As-Is" maps.

Companies from within the COMIT community and relevant external contacts were asked to provide any material they had relating to each process; this included project procedures, existing forms, and QA documentation. This was supplemented with a literature review of research carried out in this area.

Material was received from 25 companies including most of the major contractors. This was then used to produce generic "As-Is" process maps for each of the 11 processes.

Using the "As-Is" process maps, activities were identified which could be improved through the use of Mobile IT. These areas are annotated and highlighted in yellow on the maps.

Five of the COMIT companies attended a workshop to ratify the "As-Is" process maps and the areas highlighted for improvement.

Once the "As-Is" maps were finalised these were taken as a basis for the "To-Be" process maps which illustrate how the processes could be enhanced using Mobile IT.

Through the use of Mobile IT, data can be collected electronically at the point-of-activity. This results in many of the highlighted activities being automated, thus reducing substantially the time spent producing reports and transferring information.

Additionally the quality of information collected and hence produced is increased due to the lack re-keying and data entry errors.

The narratives

A narrative has been produced to accompany each set of process maps. This provides an overview of the process, the issues that are present with the current approach, ideas for mobile solutions, details of the benefits that they bring and an assessment of how easy the solutions would be to implement.

These have also been ratified by the COMIT community.

Mobilisation "scores"

A subjective assessment has been made of the how widely relevant solutions are available today, the benefits to the end-user, the benefits to the organisation and the ease of implementation.

These "scores" (red, orange, green) are given at the top of each process narrative to provide information at a glance and help you to decide which processes should be considered for the implementation of Mobile IT.

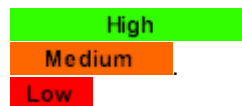
Solutions

An assessment of available solutions is made in accordance with how many solutions are available, their affordability, and are they in current use in the construction industry and/or will they require customisation to suit the particular process under consideration. The scores given are:



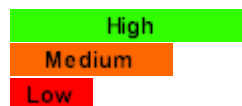
User benefits

For any mobile solution to succeed it must deliver benefits that are directly apparent and of value to the end-user. This will encourage the adoption of the solution and hence help to deliver the organisational benefits. The scores given are:



Org. benefits

The user benefits will result in benefits to the organisation. In addition benefits will be derived through the collection of more accurate information, the reduction of information transfer time and the ability to search and utilise the electronic information subsequently. The scores given are:



Implementation

The ease of implementation is assessed in accordance with whether the solutions are already in use on construction or similar industries, the readiness of the users to take up the technology and the current extent of electronic information in the process. Hence a judgement can be made on the length of time and the effort that would be involved in the implementation. The scores given are:

