



Dear Colleague,

I am delighted to announce the launch of our new web site, due to go live in May. Not only have we given it a new, cleaner, look, but it has more functionality and is easier to navigate. You can now access and download over 500 resources, subscribe to free weekly ITCBP Intelligence briefings on IT topics, and keep up to date with the latest research, events, special offers and publications. You can also sign up for our monthly

bulletin. Visit www.itcbp.org.uk to see the full range of services and resources we now offer.

It is only a few weeks to go before the second annual ITCBP conference, **MAKING IT PAY**, on Wednesday 21st May. I hope you have booked your place but, if not, remember that as an ITCBP member **you can save £130 on the standard delegate fee**. We have lined up an impressive programme of speakers, case study driven presentations and interactive workshops. When you book your place, don't forget to submit a question for the panel debate chaired by Richard Saxon. See page 3 for more details.

In this issue of **@itcbp** we have a special focus on Knowledge Management with an article taken from a report on techniques and technologies for Knowledge Management. Finally, in the 'Input' column, Professor Paul Quintas talks about the role of IT within Knowledge Management.

You can order various free ITCBP publications using the enclosed forms, or through the web site www.itcbp.org.uk

Yours sincerely

Anna McCrea

Consultant, Davis Langdon Consultancy

IT Construction Best Practice Team Member

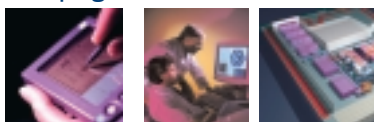
New look website to launch in April see page 2



ITCBP Annual Conference
21 May 2003, RIBA, London

MAKING IT PAY

Ensuring a rapid return on investment from IT in construction see page 3



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@itcbp

Save £130
ITCBP Conference
21 May 2003
see page 3



IT CONSTRUCTION BEST PRACTICE

What's new from IT Construction Best Practice

New look web site with new services www.itcbp.org.uk



Our new web site is to be launched at the end of May, with the host of new pages, facilities, resources and services.

The new site offers:

- A monthly personalised e-bulletin which you can customise
- ITCBP Intelligence weekly briefings on IT topics and what they mean for the construction industry
- New topic pages including IT and Sustainability, Knowledge Management and Getting Online
- Links to software vendors and suppliers
- Monthly feature
- Improved news service – incorporating the very latest research news, IT news, construction news and legal news
- Micro-sites including Technology Watch (see page 7)
- Improved navigation and a cleaner, brighter design.

E-Construction
Knowledge Management
Intergration & Modelling
Analysis Design Drawing
Health & Safety
IT Law
Business & Management
Cost & Finance
Getting Online
IT & Sustainability
Construction Clients
Technology Watch

Project Collaborative Extranets for Construction

CICA have produced a guidance sheet on project collaborative extranets. The full guidance sheet is available on the ITCBP web site but here is a short, edited extract.

A collaborative extranet can simply be a transfer of files between parties as and when required, a web site where files can be lodged and retrieved, or a fully hosted service including document management and other project related services.

Systems Selection

Unless the user organisation plans to host the service as an in-house operation, the selection process should include an assessment of the technical, organisational and financial standing of the vendor organisations.

When visiting the short-listed vendors to investigate their systems and service, it can be beneficial to use previously thought-out tests. At the very least, a structured check list of key issues should be worked through. Actions involving the handling of large quantities of data, such as multiple uploads of drawing files, can be particularly telling.

Training and support are key issues. The visit to the vendor's premises should include observing the help desk facilities in action.

Construction projects generate very large quantities of digital data. When this is held centrally for a collaborative extranet, fast access, high volume storage is required. Some vendors use third party storage facilities or server farms to provide the volume of storage required. In some cases the data may actually be being stored outside the UK. A particular vendor's arrangements should be known and its implications understood. For example, what happens if the third party data host outside the UK goes bankrupt?



For a list of **How to...** guides, published by Construct IT, and to claim your free copy, use the enclosed order form or email itcbp@davislangdon-uk.com

To be published before September 2003:

- Align an IT strategy to the industry vision**
- Develop and improve a website**
- Computer aided estimating**
- Determine project communications**

Case studies available at www.itcbp.org.uk

There are now over forty short case studies available from the web site, some of which are also available as printed documents. If you would like a paper version please use the form enclosed with the newsletter or contact us at itcbp@davislangdon-uk.com

Let us know if you think you have a case study suitable for publication.

extract from Case Study IT041 Using a project extranet to support partnering in a prime contract



The 34-acre Andover North Site Redevelopment (ANSR), was procured as a Prime Contract. Citex was awarded the contract, and agreed contracts with each member of a supply chain.

To support the partnering culture of openness and transparency, the team agreed to use a web-based collaboration system, a project extranet.

Data is available to every team member through a secure, project-specific website – accessible by authorised individuals from any location.

Key benefits

- Improved team integration through a single, shared source of the latest information
- More transparency, and better accountability through a full audit trail
- Cost and time savings in printing, copying, distribution, storage and retrieval of information
- Replacement of large paper-based archive of as-built information with searchable electronic archive for operation and maintenance requirements

Forthcoming events...

Visit the Events diary at
www.itcbp.org.uk

IT Construction Best Practice Annual Conference
21 May 2003, RIBA, London

MAKING IT PAY

Ensuring a rapid return on investment from IT in construction

Will the implementation of new IT applications provide a significant return on investment in a commercially viable timescale?

This is one of the most challenging questions to face the construction industry over the past five years. **IT Construction Best Practice's** 2003 annual conference addresses this and other major IT-related issues within the industry. This one-day event is packed with case study driven presentations and interactive workshops from major players from across the industry including:

Arup • Asda • BAE Systems • Billington Structures • BIW Technologies • BSRIA • Building Centre Trust • CPIC • Costain • Davis Langdon & Everest • Ernst & Young • MANSELL • Masons • Six Continents Retail • Symonds Group • Unipart • Whitby Bird & Partners



Have you claimed your £130 discount yet?



Designed to focus on delivering practical information and guidance relevant to business-critical areas, leading organisations from all sectors of the construction industry present real business case scenarios.

You will be able to submit questions for a 'BBC Question Time' style debate to be held on the day. And, at the end of the day, you can network and discuss issues at leisure at an informal drinks reception.

Save 40% off the registration price

Registration is priced at £325+VAT but UK construction-related companies registered with ITCBP can save £130 and attend for just £195+VAT.

For details, please contact the organisers: Natalie Rubinstein, Construction Plus, 151 Rosebery Avenue, London, EC1R 4GB. 0207 505 8614 natalie.rubinstein@emap.com

See the full conference programme at www.itcbpconference2003.co.uk

Seeing is Believing

Workshop to be held in June in London. For further details contact Sue Langley, CITE 01386 793300 sue@cite.org.uk

IUKE Company visits

Tel: 01730 235015 www.iuke.co.uk
Company visits with seminars that cover IT issues. £125+VAT.

DATE	VENUE
17 Apr	Mace Ltd, London
21 May / 20 Aug	Crown House Engineering, Wolverhampton
22 May / 20 Nov	Wates Construction, London
25 Sept	Wates Construction, Basingstoke

E-commerce Awards

www.ecommerce-awards.co.uk

For small firms that have achieved real business benefits through their use of the Internet.

- Over 50 cash prizes totalling £182,000.
- National and regional press coverage.
- Recognition as a best practice business.
- Make new contacts and establish new partnerships

FREE to enter



Workshops for senior managers

CIRIA Tel: 020 7222 8891 www.ciria.org.uk
Workshops, normally priced at £65 but free to companies registered with *IT Construction Best Practice*

DATE	TOPIC	LOCATION
1 May	Ways of utilising ruggedized computers to improve performance on site	Birmingham
12 Jun	How organisations are capturing and disseminating information (Knowledge Management)	Manchester
1 Jul	Learning from the best	London

Meet the IT providers ITSHOWCASE

Exhibition of software vendors and free seminars
Tel: 01425 477565
www.itshowcase.co.uk
general@itshowcase.co.uk

DATE	VENUE
20 May	Leeds United Football Club, Leeds
21 May	Lumley Castle, Durham
17 Jun	Kings Hall Exhibition Centre, Belfast
18 Jun	Murrayfield stadium, Edinburgh
16 Sep	Pride Park Football stadium, Derby

IT advice for all SME businesses



Workshops and seminars on general IT topics for small or medium-sized business. www.ukonlineforbusiness.gov.uk

DATE	TITLE/HOST	LOCATION
30 Apr	Broadband	Luton
20 May	E-mail marketing	Woking
3 June	Internet World	London
5 June	Improve your website	Leeds
10 July	Making more profit from your business	London

Seminar on new code of practice CPIC

www.productioninformation.org
£60 including a copy of the new Code. See page 6 for details.
pg.jordan@virgin.net

DATE	VENUE
9 May	Jarvis Hall, RIBA, London

Dates and venues may change. Contact the organisers directly for further information

visit our web site at www.itcbp.org.uk or contact us by email: itcbp@davislangdon-uk.com

Techniques and Technologies for Knowledge Management

This edited extract is taken from the interim report of a 2-year study, *Knowledge Management (KM) for Sustainable Construction Competitiveness* funded by the Department of Trade and Industry (DTI) as part of the Partners in Innovation Programme (Pii).

The interim report provides an overview of the technologies and techniques available for knowledge management in organisations. A further report is due in September 2003.

For the full interim report and detailed information on the study visit the ITCBP web site or the project web-site www.knowledgemanagement.uk.net

Knowledge Management Techniques

KM techniques do not depend on IT, although they can provide support, for example, in knowledge sharing, which can take place through face-to-face meetings. KM techniques are affordable as no sophisticated infrastructure is required although some techniques require more resources than others. They are easy to implement and maintain due to their simple and straightforward nature. Finally, they focus on retaining and enhancing the organisational tacit knowledge, a key asset to organisations.

KM techniques include:

- Brainstorming
- Communities of Practice (CoP) also called knowledge communities, knowledge networks, learning communities, communities of interest and thematic groups.
- Face-to-Face Interaction
- Post-Project Reviews
- Recruitment
- Apprenticeship, Mentoring and Training

Knowledge Management Technologies

KM technologies depend heavily on IT. Different technologies are used for different KM processes. For example, Knowledge Mapping Tools, Knowledge Bases, and Case-Based Reasoning are technologies for capturing knowledge. Although there is a debate about the degree of importance of KM technologies, many organisations consider them as important enablers to support the implementation of a KM strategy as they consume a third of the time, effort and money required for a KM system. The other two-thirds mainly relate to people and organisational culture. From a return

on investment (RoI) perspective, organisations need to capitalise and exploit IT for KM. With the evolution in IT hardware and software, IT tools can act as dynamic capabilities or core competences for organisations, if effectively exploited.

KM technologies consist of a combination of hardware and software technologies.

Hardware technologies and components are critical in a KM system as they form the platform for the software technologies and the medium for the storage and transfer of knowledge. Hardware requirements for a KM system include:

- Personal computer or workstation for access to the required knowledge
- Highly powerful servers enabling the organisation to be networked
- Open architecture to ensure interoperability in distributed environments
- Media rich applications requiring Integrated Services Digital Network (ISDN) and fibre optics for high speed
- Asynchronous Transfer Mode (ATM) as a multi-media switching technology for handling the combination of voice, video, and data traffic simultaneously
- Use of the public network (e.g. Internet) and private networks (e.g. Intranet, Extranet) for access to and sharing of knowledge.

Software technologies play an important part in the implementation of KM. The large number of vendors providing KM solutions makes it extremely difficult to identify the most appropriate applications. Organisations have therefore adopted a range of models for establishing KM systems:

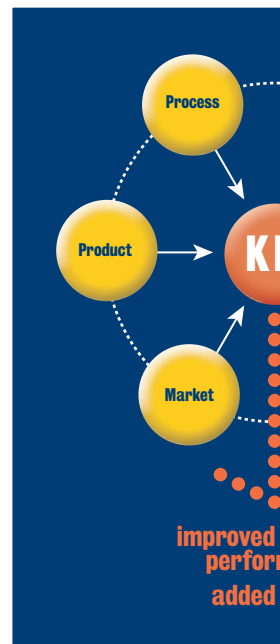
- **Customised Off The Shelf (COTS)** – the applications are identified and examined against the functional needs of the organisation. A short test period may be needed to pinpoint the most suitable application. Once an application is acquired, it can be customised to integrate it into the organisation's information system.
- **In-house Development** – usually with external technical help. Examples are Notes, Domino, and Intranet applications. There are several reasons that make this option generally less attractive. These include the difficulty of establishing KM systems' requirements, high cost, risk and the complexity of developing bespoke systems.
- **Solution Re-engineering** – involves adapting an existing generic solution to the KM problem with the help of KM consultants and technical architects.

Examples are online knowledge communities and virtual collaboration tools.

- **Knowledge Services** – knowledge applications provided by a third party that hosts the application on the Web. The user accesses the service via a thin-client such as a browser. The main benefits are the waived software licensing fee and the avoidance of in-house maintenance. Disadvantages include reduced security and privacy.
- **Knowledge Marketplace** – a third party vendor hosts a web site, grouping together suppliers of knowledge services. Suppliers may include expert advisors, vendors of product support services, KM job placement agencies, procedures for the evaluation of KM and portal software, and research companies providing industry benchmarks and best practice case studies. Two types of Knowledge Marketplace exist. One provides common information and services to all industries while the other offers only certain services to a specific industry.

KM software technologies have seen many improvements since 2000 due to alliances, and mergers and acquisitions between KM and portal tool vendors. Despite this, none gives a complete solution to KM. These tools are better described within technology groups such as data and text mining, groupware, etc.

Data and text mining - A technology to extract meaningful knowledge from masses of data or text. Data are single facts (structured) about events while text refers to unstructured data. The process of data or text mining enables meaningful patterns and associations of data (words and phrases) to be identified from one or more large databases or 'knowledge-bases'. The approach is useful for identifying hidden relationships between data, creating new knowledge. Used in business intelligence, direct marketing and customer relationship management applications, it is difficult to access data through an enterprise-wide corporate



portal where an organisation only has a small group of data miners.

Groupware - Useful for group decision-making, Groupware supports distributed and virtual project teams where team members are from multiple organisations and in geographically dispersed locations. Groupware tools usually contain email communications, instant messaging, discussion areas, file area or document repository, information management tools e.g. calendar, contact lists, meeting agendas and minutes, and search facilities.

Intranet – An inter-organisational network that is guarded against outside access by security tools called firewalls. **Extranet** is an Intranet with limited access to outsiders, making it possible for them to collect and deliver certain organisational knowledge. This knowledge can therefore be made available to geographically dispersed staff members.

Knowledge bases – Repositories that store knowledge about a topic in a concise and organised manner. They present facts that can be found in a book, a collection of books, web

sites or even human knowledge.

Taxonomy – A collection of terms, and the relationships between them, commonly used in an organisation. A relationship can be hierarchical, where one term is more general and so subsumes another term, functional, where terms are indexed based on their functional capabilities, and networked, where there are multiple links between the terms.

Ontologies – Define the terms and their relationships, which comprise taxonomies, as well as supporting deep (refined) representation for both descriptive and procedural knowledge of each term (concepts). Ontologies also support defined domain theories that govern the permissible operations with these concepts.

A taxonomy or ontology can be developed manually by using building tools, automatically from a repository of knowledge assets, or purchased off-the-shelf. Taxonomies and ontologies serve

multiple purposes in an organisation. They can be used as a corporate glossary holding detailed descriptions of every key term used in the organisation. They can also be used to constrain the search space of search engines and prune search results, identify and group people with common interests, and act as a content or knowledge map to improve the compilation and real time navigation of Web pages.

KM Tools used by UK Construction Organisations

A range of techniques and technologies can be used in construction organisations for knowledge management. Most of the technologies are relatively new and are still evolving. A recent survey of 170 UK construction organisations carried out by Loughborough University shows that communities of practice are most widely used as a technique in large organisations. Large construction organisations with a range of specialist skills tend to have the need and resources to set up communities of practice and to benefit significantly from them. Conferences and seminars were identified by small construction organisations as the most popular technique for knowledge sharing and updating knowledge.

According to the survey, the most widely used technology is the Intranet. Intranets can provide a platform for knowledge sharing in large construction organisations, geographically dispersed with diverse knowledge to share. Other popular technologies are document management systems (e.g. Documentum and Sage Desk), groupware (e.g. Lotus Notes, Lotus Quickplace, Live Link and e-Room) and taxonomy tools (e.g. Autonomy). The use of these technologies is likely to increase as collaborative working becomes more important in construction supply chains. Extranets and electronic discussion forums are used to a limited extent but the use of Extranets should increase as new ways of procurement involving several construction supply chains, as in partnering arrangements, become more widely used.

These techniques and technologies provide valuable support for knowledge management. However, the large number of technologies available in the market place makes it difficult to identify the most appropriate tools for an organisation. The goal of the KM strategy, the nature and location of knowledge and the capabilities of the tools will all inform the selection of appropriate techniques and technologies.

Keeping your web site secure



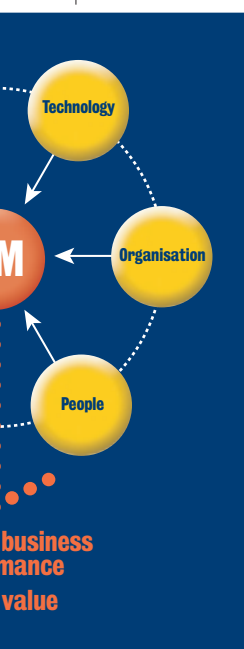
UK Online for Business publishes a series of guides for small and medium sized businesses on IT issues. Most of these

are relevant to construction businesses and the guides can be downloaded from the ITCBP web site. The following is an extract from **E-Security: A Guide For Small Businesses**, which provides some simple, practical measures to help you reduce the risk to your company's communications, data and services.

The chances of vandals attacking your web site are slim – but if it can happen to some of the world's high-profile sites, it's not a good idea to take the risk. Whether you host your own web site or outsource to an Internet service provider (ISP), the following checklist will reduce your risk to virtually zero.

- Install a firewall. It will detect and prevent any security attacks and control what Internet connections you allow in and out of your business.
- Keep a back-up of your site on a separate, secure computer.
- No matter how carefully chosen, passwords can still easily be cracked using password-cracking tools. So, for certain types of information consider using one-time passwords which can easily be achieved with strong authentication tokens.
- Only people who really need it should have access to the server.
- Check your system and web logs for suspicious activity. Keeping a log of web activity can help you spot the early signs of a system break-in.
- Get the latest software updates and security patches as soon as they're available.
- If you outsource – check the ISP's own security policy and make sure they have controls in place for protecting your information. Get a written service level agreement in which the ISP commits to providing agreed levels of security. BS ISO/IEC 17799 provides guidance and defines the key security requirements in third party contracts.

Ring the UK Online for Business Infoline on 0845 715 2000 or visit www.ukonlineforbusiness.gov.uk



Production information: a code of procedure for the construction industry



The Construction Project Information Committee (CPIC) comprising of representatives of RIBA, ICE, CIBSE and the Construction

Confederation are preparing a Code of Practice for Production Information which will provide guidance to practitioners on using CAD systems to improve production information.

Recent work on 3D project modelling has shown that cost benefits of up to 20% of contract sum are available if these techniques are used in preparing production information. In addition, savings in drawing costs of up to 18% can be expected because drawing data is shared and not redrawn and spatial co-ordination takes place because all designers are working on a single project model, which is defined by a set of common data.

The aim of the Code

The aim of this new Code is to provide practical guidance on the preparation of good production drawings, specifications, and schedules of work by making optimum use of widely adopted computer systems. It has been produced for:

- Designers, whether consultant architects, structural, civil or service engineers, specialist constructors or component manufacturers.
- Clients interested in better service and value for money for their projects and who will wish to encourage the changes in practice needed to achieve this.
- Education and training establishments that prepare those mentioned above for a career in construction.
- Providers of CPD.

Calls for greater efficiency

A report by the Building Economic Development Committee 'Achieving Quality on Building Sites' 1987, revealed that the largest single cause of quality problems was inadequate project information. More recently the reports by Sir Michael Latham 'Constructing the Team' 1994 and Sir John Egan 'Rethinking Construction' 1998 emphasised the need to eliminate adversarial attitudes and

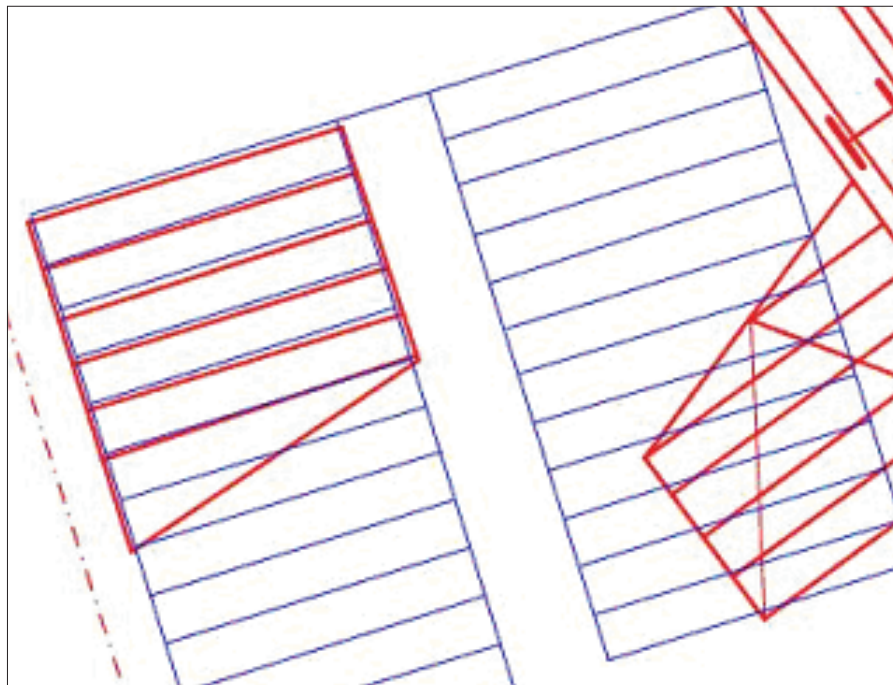
practices, and to develop effective team working. Both recognised the importance of good project information, and a major part of the large cost savings projected by Egan are expected to arise from more effective use of IT in the preparation and use of project information.

The importance of production information

Production information is conveyed by drawings, specifications and bills of quantity or schedules of work. Unless this

avoiding expensive delays and re-working. A recent Egan 'demonstration' project at Stansted Airport on which 3D modelling was used (see *ITCBP Case Study ITO40*) has shown that cost benefits of at least 10% of contract sum can be achieved. Also, significant savings in drawing costs can be expected because drawings data is shared and not re-drawn.

At present most production drawings are produced using conventional 2D CAD systems, but despite this the inadequacies of the manual methods remain (see *the*



information is complete, accurate and co-ordinated it will not be effective and, no matter how good the design, it will not be satisfactorily realised on site. Poor production information causes delays, extra costs and poor quality, which in turn give rise to disputes over who is responsible for the problems. Good production information is therefore of vital importance to the success of the project.

The impact of IT and CAD

Recent developments in IT and CAD have made it possible to build a virtual prototype of a project (i.e. a 3D model) in a computer. This enables errors, omissions and co-ordination problems in the production drawings to be identified and rectified before work starts on site,

Lack of registration between drawings
Electronic overlay comparing two different drawings approved for construction (architect's drawing – red, structural engineer's – blue)

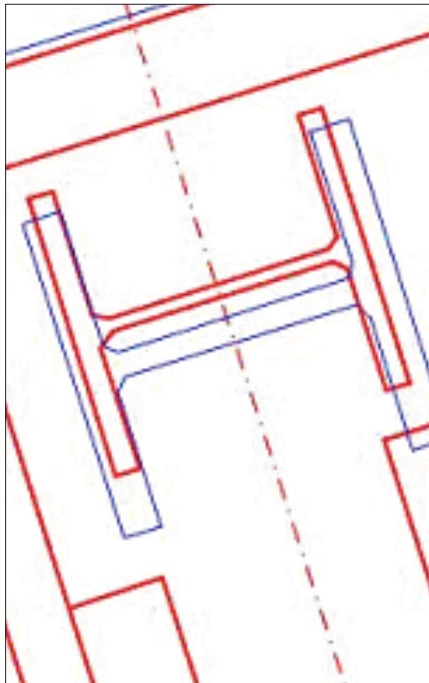
figures on page 6). However, if the disciplined procedures associated with the use of 3D modelling are used to produce 2D models, a substantial part of the benefits of 3D modelling can be achieved. The adoption of such disciplines will also prepare designers for the use of 3D modelling.

In parallel with the development of CAD systems, computerised specification systems have been developed to the point that they are now supplanting traditional

Construction industry

word processing methods. Most recently, a computerised schedule of work system has been developed, potentially extending the benefits of co-ordinated production information to the sector of the industry handling small jobs and refurbishment.

Although this Code mostly refers to building projects the principles apply equally to civil engineering projects. In many ways civil engineering construction has led the way, using 3D models from which to generate production drawings for highways, railways, earthworks, etc.



Differences in size and location of columns
Electronic overlay comparing two different drawings approved for construction (architect's drawing – red, structural engineer's – blue)

The Code can be purchased from selected book shops for £25.00 per copy or by mail order for £20.00 per copy.

There will be a seminar on the new Code on Friday 9 May 2003 in the Jarvis Hall at the Royal Institute of British Architects. The fee of £60.00 will include coffee, lunch and a copy of the new Code.

Further details, including the full introduction, and order/booking forms are at www.productioninformation.org or from P.G. Jordan, email: pg.jordan@virgin.net

TECHNOLOGY WATCH for the UK Construction Industry

an ITCBP service

Technology Watch is an interactive web site devoted to illustrating how potential new technologies might benefit professionals and their companies in the construction industry. Check out the site at www.technology-watch.info and send any comments on the features and future content to tw@nbat.co.uk.

A recent article published on the Technology Watch site...

Increased Efficiency and Profitability by Electronic Document Management

What are the benefits?

Whether you have a particular function within your organisation that could be made more efficient, or whether you are leading a partnering project, such systems can provide the following benefits:

- Greater efficiency in document issue, day-to-day access, retrieval and archiving
- Greater staff awareness of the status of an increasing number of documents
- Greater control of the currency of documents leading to less abortive work
- Improved communication within the company or design team when staff are located in a number of locations nationally or internationally
- Improved record keeping for regulatory compliance
- A clearer audit trail, with records of when a document was sent, to whom, when it was read and when the instruction was completed

How is it done?

- A web-based intranet or extranet for remote access, or an internal network, is set up using, for example, Lotus Domino in conjunction with Microsoft Exchange.
- A cost-effective knowledge base is created across an entire project team.
- Existing paper documentation and electronic information is co-ordinated under a single system.
- The life cycle of a document can be controlled by built in process management features.
- Up-to-date information is then shared on line and in real time via a project or company intranet.
- Documents are searched through a variety of logical fields, rather than through a single directory structure.
- Rapidly changing information is tracked, with notification and reminders automated.

What documents can an EDM system handle?

EDM can handle all documentation that flows in and out of site offices every day, much of which has contractual significance. Documents may include:

- site instructions
- variation orders
- design drawings
- inspection certificates
- contract documents
- health and safety documentation
- requests for information
- minutes of meetings
- site photographs

Since these documents are costly to administer manually, an EDM system will have the major benefits of saving time and increasing efficiency. For instance, if you are telephoned by a contractor who wants to discuss a particular document, you can find it immediately on your computer screen and resolve the enquiry there and then, rather than spend time searching for the paper document in your filing cabinet, then contact the contractor yourself, only to find that he is no longer available. The responsibility for resolving the problem has become yours!

What can the GEDYS EDM system provide?

One such system is offered by GEDYS-DISKUS. The advantage of this system is that it is fully web-enabled, making it possible for new partners/users to benefit from the document management system using their existing Internet access. All that needs to be done is to determine the degree of access that the new user will have, then provide a web address and password.

Other advantages include:

- Users can determine their own file structures.
- Issuing and archiving routines are fully automated.
- The system integrates seamlessly with Microsoft packages.
- Elements of the system can be PDA-enabled via GPRS connected with a mobile phone.

What do you need to know?

If there is a technology that you think could increase your efficiency, but you are not sure what is involved and you need more information on how to make a decision, contact Technology Watch: tw@nbat.co.uk

INPUT Knowledge Management – is IT in the driving seat ?



In each issue, a key figure from the construction sector looks at important IT developments and issues.

Paul Quintas is Professor of Knowledge Management at the Open University Business School. He is a partner on the DTI project Knowledge Management for Sustainable Construction Competitiveness (see page 4 of this issue of @itcbp and www.knowledgemanagement.uk.net). He is author of over 100 books and

papers on knowledge and innovation management and advises many companies and international organisations.

Two things are particularly striking about the current interest in knowledge management. The first is that it took so long for managers, and indeed business schools, to get around to talking about knowledge and how to manage it. Before 1996 very few used the phrase 'knowledge management'. It seems obvious that all organisations, large and small, are engaged in a whole range of processes that involve knowledge, so why didn't managers talk previously about managing knowledge? The second surprising thing is the widespread assumption that information technology (IT) will provide the solution to the problem that is knowledge management. After all, 'information' is not the same thing as 'knowledge'.

So what does this imply for the role of IT in knowledge management?

Although 'knowledge management' has only recently entered the vocabulary, knowledge processes have been functioning for many years, not least in the construction industry. Indeed, some of the hardest challenges for the new breed of knowledge management professionals are those that have the oldest solutions. And these solutions do not involve IT.

But how do we share tacit knowledge? How can we communicate to others the things that we know, but cannot express in words? A skilled violinist could write a manual, the recipe for playing a violin, but reading that manual would not make you a violinist. That is one of the differences between information and knowledge. The manual contains information, but *knowing* how to play a violin requires more than the recipe or instructions. It requires understanding – the interpretation of new information in the light of what we already know. And of course it requires experiential learning, or as the violin teacher might say: practice, practice, practice. And it helps if there is an expert on hand to see where we are going wrong and to guide that learning. This is essentially the apprenticeship system. Perhaps we should now regard it as a knowledge-sharing tool.

The type of experience-based knowledge mentioned above cannot be codified and so cannot be captured in any current form of IT system. However, IT systems can store, process and communicate data and information. Codified knowledge (e.g. the sort that can be expressed in language) is also information. And if we focus on information, then we don't need to introduce that troublesome word 'knowledge' at all, and we can concentrate on improving information management processes through the effective use of IT.

But let's not write off the potential of technology to contribute to knowledge processes. It helps if we refer to ICTs – Information and Communication Technologies. Computers today are as much communication devices as they are stand-alone tools for storing data, drawing and design, word processing or number crunching. And communication is a fundamental process in any approach to managing knowledge. ICTs can contribute by providing communications channels, putting people in touch with people so they can do what humans do naturally – communicate.

Many organisations have learned the hard way that IT cannot be the central focus, or indeed the driver, of a knowledge management strategy. Let me take just one aspect of knowledge management, knowledge sharing. There are many examples of IT solutions focusing on intranets, or knowledge stores that aim to capture knowledge and make it available to others. These often have problems. First, knowledge capture is problematic and can only be partial. Second, the assumption that knowledge created in one context can be understood and relevant in another context, without a great deal of work, may be misleading. This is especially true where there are attempts to capture knowledge without knowing where or when it might be used. Third, the availability of an IT system cannot ensure people will use it as intended. Installing an intranet in an organisation that has a culture of secrecy, internal competition and lack of trust is likely to result in a system that is rarely used, or even boycotted. Knowledge sharing requires a culture of trust, openness and co-operation. If others do not reciprocate we soon stop sharing our own knowledge.

If you look at the internal knowledge management initiatives in many of the large IT companies you will find that they use technology in a supporting or enabling role. They recognise that knowledge management involves far more than IT. They know the limitations – IT can only deal with knowledge in so far as it can be represented or codified. So, as Lary Prusak of IBM's Institute for Knowledge Management says, connectivity (communication, linking people together) wins over knowledge capture. The aware companies also recognise that organisational culture has a crucial bearing on knowledge processes.

Knowledge management may be a new term, and all organisations can benefit from the fresh impetus it gives to thinking about fundamental processes, but your own organisation already manages knowledge, as organisations have done for centuries. Not only does this happen without the help of IT, most of it happens informally and without acknowledgement. That we can support these processes more effectively is not in doubt. That ICTs have a place is unquestionable. But ICTs must work with, not against, the key fundamentals that make human beings knowledgeable in social contexts.

Paul Quintas can be contacted at p.quintas@open.ac.uk.

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For information please contact:
IT Construction Best Practice
Davis Langdon Consultancy
FREEPOST LON14305, London WC2B 6BR
Fax: 020 7379 3030
Email: itcbp@davislangdon-uk.com
Web: www.itcbp.org.uk

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