

e-Submission System Briefing

Time	Programme
1.30 pm	**Registration**
2.00 pm	**Introduction**
	Aim of Presentation
	CORENET (Construction and Real Estate NETwork)
2.10 pm	**The CORENET e-Submission System (eSS)**
	Multimedia Show
	Basic Setup Requirements for eSS
	Common Concerns from the industry
	Assistance Schemes Available for eSS
2.50 pm	**Electronic Submission For Professional Application (ESPro)**
	Layout of offline application
	System Demonstration
3.20pm	**Summary**
3.30 pm	**Q & A session**
4.00 pm	**End of Briefing**

19 April 2002

CORENET e-Submission

Presented By:

Genevieve Tan
Technical Consultant
Building and Construction Authority

Introduction to CORENET

Content

- Aim Of Presentation
- Introduction To CORENET (COnstruction and Real Estate NETwork)
- The CORENET e-Submission System (eSS)
- Basic Setup Requirements For eSS
- Common Concerns From The Industry

Introduction to CORENET

Content (Cont'd)

- Assistance Schemes Available For eSS
- Electronic Submission For Professional Application (ESPro)
- Summary of eSS

Introduction to CORENET

Aim of Presentation:

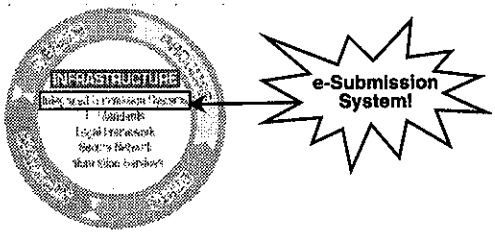
- To have a general understanding of CORENET e-Submission System (eSS) and its application tools.
- Available Training and Assistance Schemes

Introduction to CORENET

CORENET (COnstruction and Real Estate NETwork):

- Major IT initiative led by MND
- Driven by BCA in collaboration with both the public and private organisations
- OBJECTIVE is to re-engineer the business processes of the construction industry

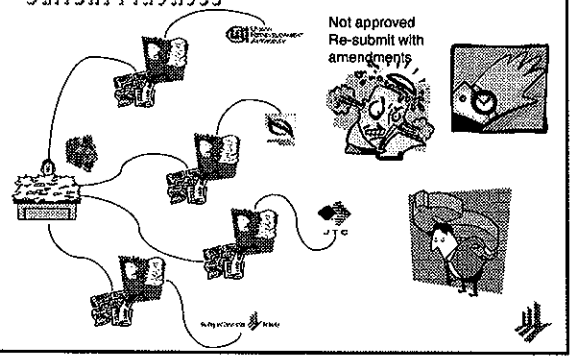
Introduction to CORENET



e-Submission System is one of the key infrastructure systems under the CORENET programme, aimed to create IT enhanced collaborative design environment.

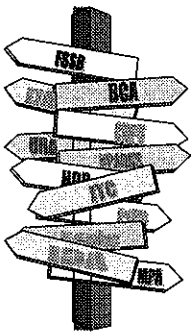
Introduction to CORENET

Current Practices



Introduction to CORENET

Current Practices:



- Need to produce multiple hardcopies for submission
- Need to make frequent trips to various agencies to submit
- Need to set aside significant office space for storage of plans and documents
- Able to submit only during office hours



INTRODUCING:

THE CORENET e-SUBMISSION SYSTEM (eSS)

The CORENET e-Submission System

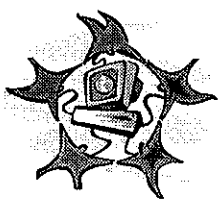
Multimedia Show On Overview Of CORENET e-Submission System

The CORENET e-Submission System

What is eSS?

- Government to Business (G2B) internet-based portal
- Specially designed for industry professionals
- Submit project related plans and documents to regulatory authorities

The CORENET e-Submission System

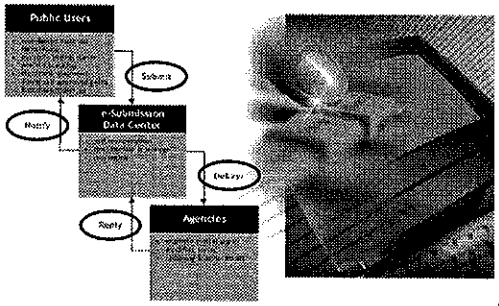


Key Features:

- Multiple digital signatures on plans and documents
- Populated common data on submission forms
- Central repository of approved plans
- Tracking of submission status online

The CORENET e-Submission System

Workflow of eSS:

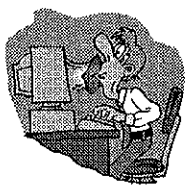




Electronic Submission System

The CORENET e-Submission System

Benefits of eSS:



- Making it easier for industry professionals to submit plans & documents for approval
- Submit anytime
- From anywhere
- Eliminate multiple trips to agencies
- Eliminate repeated data entry
- Minimize production of hardcopies
- Eliminate storage space of hardcopy prints



Electronic Submission System

The CORENET e-Submission System

Participants:

Participating Regulatory Authorities :
- Building and Construction Authority
- Urban Redevelopment Authority
- Land Transport Authority
- Public Utility Board Water
- Singapore Power
- Housing & Development Board
- Jurong Town Corporation
- Fire Safety And Shelter Bureau
- Central Building Plan Unit
- Infocomm Development Authority
- National Parks Board
- Maritime and Port Authority
- Energy Market Authority

Industry Representatives :
- Singapore Institute of Architects
- The Institution of Engineers
- Association of Consulting Engineers
- Real Estate Developer's Association
- The Singapore Contractor Association



Electronic Submission System

BASIC SETUP REQUIREMENTS FOR eSS

Basic Setup Requirements for eSS

Hardware:

- Pentium PC with 400 Mhz and above
- Minimum 64 MB RAM
- Broadband connection
- Minimum 1GB hard disk capacity
- Netrust Smartcard Certificate version 3 and Smartcard Reader

Basic Setup Requirements for eSS

Software:

- Windows 98 and above
- Microsoft Internet Explorer ver5.x browser and above
- ESPro application
- InternetForms Viewer v4.4.x and above
- Digital Signer application

Others:

- EDAForm application (offline module)
- JRE 1.3 (comes with the EDAForm application installation program)

COMMON CONCERNS FROM THE INDUSTRY

Common Concerns From The Industry

Will e-Submission Increase My Office Operation Cost?

✓ e-Submission saves, even the small design practices!

- ✓ it does not cost thousands of dollars
- ✓ saves lots of overheads in printing and despatch
- ✓ Greater intangible savings in time spent collating and checking printed project documents received from printer for submission purposes
- ✓ And so on.....

Common Concerns From The Industry

Items	Set up	Recurring
1. Registration with licensed Certification Authority (e.g. Netrust)* • Applicant will be issued with an identity card	$85	$50/yr
2. Smart Card reader	$55	$0
3. High-speed Internet connection**	$150	$100/mth
4. Form filling tools***	$200	$30/yr

* early adopters will receive the certification authority registration license free of charge

** figure varies between ISP providers. The estimated are for low usage of 2GB per month schemes

*** early adopters will receive the form tools free of charge

Common Concerns From The Industry

Estimated Savings (for small projects) :

Savings in printing of hard copy drawings for ONE submission (exclude re-submissions)	$105 - $360 per submission
Savings in despatch for one submission	$15 - $90 per submission



ASSISTANCE SCHEMES AVAILABLE FOR eSS



Assistance Schemes Available For eSS

INTECH:

- Training grant of 70% of the course fee under the Initiatives in New Technologies (INTECH).
- Offered by EDB and administered by BCA.
- The scheme is applicable to:
  - ✓ Singaporeans or Singapore PR
  - ✓ Not applicable for ministries and statutory boards.
- More details available at CORENET web site, under IT Training and Promotion.



Assistance Schemes Available For eSS

Jumpstart Construction:

- Subsidises industry SMEs' cost for e-Submission System set-up and development of other e-business capabilities.
- Funding up to 50% of e-commerce development cost or S$20,000, whichever is lower.
- Grant offered by PSB and administered by BCA.
- Claim requires evidence of >= 3 online transactions.
- Supported components are consultancy, hardware, proprietary software and subscriptions.
- Refer to www.corenet.gov.sg for more information.

Electronic Submission For Professional Application (ESPro)



Electronic Submission For Professional Application (ESPro)

What is ESPro Application?

- Offline application tool
- To manage and prepare the document offline for submission to the regulatory authorities via the CORENET e-Submission System.

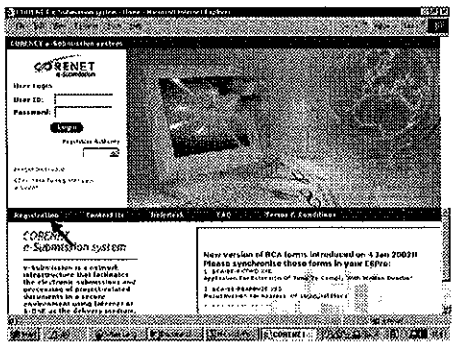
Electronic Submission For Professional Application (ESPro)

1. Registration of User
   - Obtain User ID
2. Download ESPro Application
   - Offline application tool

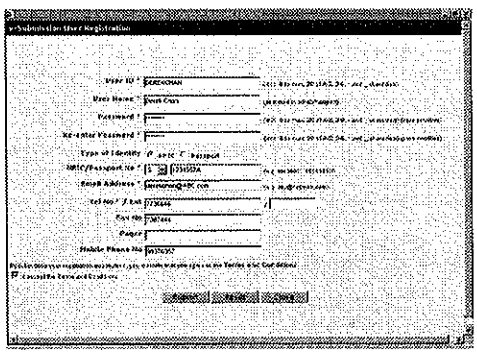
3. Register Project
4. Selection of Forms to Download
5. Completion of Forms
5. Add External Files (eg. Drawings)
6. Digitally Sign Documents
7. Select Appropriate Recipients
8. Submissions to CORENET server
9. Tracking of submissions online

Workflow of Using eSS

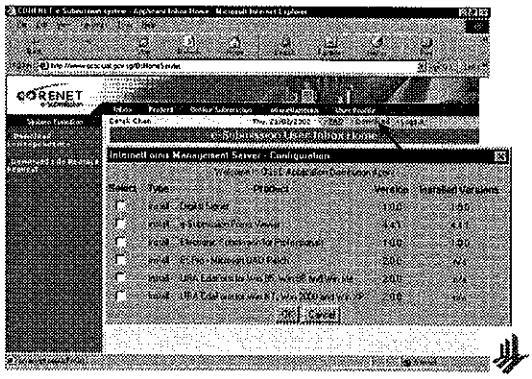
http://www.corenet-ess.gov.sg



E-Submission User Registration



Downloading of ESPro Components



Electronic Submission For Professional Application (ESPro)

Demonstration
Of
ESPro Application

Electronic Submission For Professional Application (ESPro)

Roles Of:

PROJECT COORDINATOR	REGISTERED PROJECT MEMBERS	REGISTERED eSS USERS

Electronic Submission For Professional Application (ESPro): Roles

Project Coordinator

- Make Submissions
- Register Project
- Make Project Enquiries or View Project Profile
- Assign Access Rights to other Existing Project Members to the files submitted by him in the eSS



Electronic Submission For Professional Application (ESPro) : Roles

Project Coordinator (Cont'd)

- Request Withdrawal of the Submission / Registration of Project made by him
- Modify Project Profile and Data
- Re-assign ownership of an outgoing member's submission to another existing member
- To have access to the submitted documents



Electronic Submission For Professional Application (ESPro) : Roles

Registered Project Members

- Make Submissions
- Make Project Enquiries or View Project Profile
- View & Download his own submission files
- Assign Access Rights to other Existing Project Members to the files submitted by him in the eSS
- Request Withdrawal of the submission made by him



Electronic Submission For Professional Application (ESPro) : Roles

Registered eSS Users:

- Access online function in the CORENET eSS
- Download software from the CORENET eSS
- Download form templates in ESPro



SUMMARY



Summary

- CORENET e-Submission System
  - ✓ Key Features
  - ✓ Workflow
  - ✓ Benefits
- System Requirements for eSS
- Assistance Schemes Available
- Electronic Submission for Professional Application (ESPro)
  - ✓ Outline of ESPro Application
  - ✓ System demonstration of ESPro
  - ✓ Roles and Duties

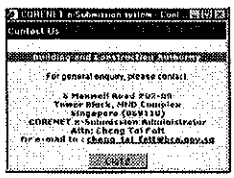


Need to Know More Information?

Training Classes:

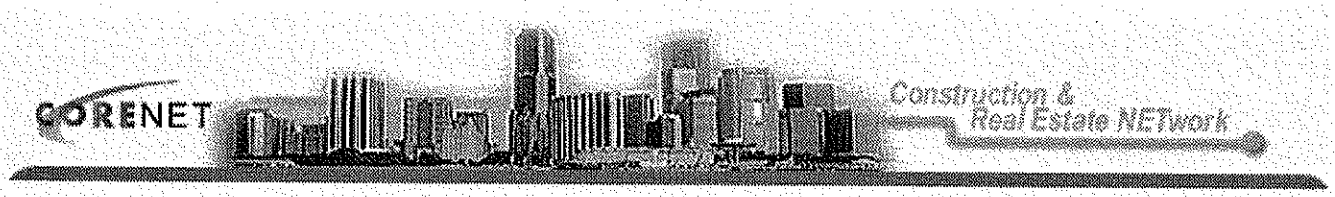
- Course content includes hands-on training on:
  - ✓ Registering as CORENET ESS user
  - ✓ Download software from ESS
  - ✓ Using ESPro
  - ✓ Using Online CORENET ESS functions
- Details are posted on <http://www.corenet.gov.sg>
- April, May & June classes open for registration.
  - April ~ full
  - May ~ 70% filled
  - June ~ 40% filled

Need to Know More Information?





Thank You!



IT Seminar 11
Re-inventing Construction with IT Standards and Digital Technologies

Keynote Speech:
Charting Our Future Direction in the Construction Industry

Presented by

Mr Seah Choo Meng
President, Quantity Surveying Council
Singapore Institute of Surveyors and Valuers

Charting Our Future Direction in the Construction Industry

I find that the great thing in this world is not so much where we stand, as in what direction we are moving.

- Oliver Wendell Holmes

1 Introduction

There's a new continent; a continent without land! [Kenichi Ohmae, 2000] It is a continent composed of new forms of computer-enabled and finance-enabled behaviour. Though this *invisible continent* exists only in our collective minds, it is as palpable and vital, as tangible and solid as if you could find it on a map.

The invisible continent is a moving, unbounded world, consisting of four dimensions:

1. A *visible world* where you can see old economy commerce, like bricks-and-mortar retail.
2. A *borderless world* in which capital moves around, chasing the best products and the highest investment returns regardless of national origin.
3. The *cyber-world*, which has changed not only the way we do business but also the way we interact on a personal level.
4. The *high multiples* awarded to new economy stocks, which are the basis of not only present wealth but what anyone with a retirement plan hopes will be future comfort.

Imagine this scenario, a Singaporean travelling in London purchases a Burberry shirt with a Visa card. In which dimension has this transaction taken place? The answer - all four. The shirt represents the visible world, whereas the purchase made in London tells of the borderless world. The method of transaction via Visa symbolizes the cyber and high multiples worlds. These four dimensions all influence each other and are reshaping the world's future.

The future is here and is now.

The Internet and e-Commerce have transformed and revolutionised the way we live, work and play. Traditional business rules can no longer apply. Firms are forced to rethink business strategies, management structures, business operations, workspace and working patterns. Shelf lives of products have been altered. The time taken to deliver the finished product from the time of raw materials purchases have dramatically shortened. Transactions have become almost immediate with the power of technologies.

E-economy has arrived and is here to stay. Furthermore with Infocomm Development Authority of Singapore's (IDA) vision to brand Singapore as an e-biz hub in the Asia Pacific, it is essential that in all business sectors – the construction industry included, change and the reconfiguration of business strategies are required. The changing e-landscape in the construction industry with its impacts and vast opportunities from plugging into cyberspace needs a paradigm shift in the mindsets of developers, professionals, contractors, sub-contractors and suppliers.

We have to learn and re-engineer our business processes to work smart and capitalise on technology. In short, businesses of the future are in a virtual marketplace with a whole new world of management styles, structures and working practices.

2 E-Economy

Let's look at some figures on e-commerce transactions and you decide whether e-commerce with all its hype is changing the competitive landscape in the global economy.

The Gartner Group reported that the North American Internet retailing market, which grew 157% in 1999, is forecast to reach US$142 billion in 2004. And also by 2004, 29 million U.S. households will have broadband access to the Internet. Broadband-enabled consumers will spend 20 times more on e-commerce sites than those using dial-up modems by 2005.

Due to the explosive interest in e-business in the EU in 2000, Gartner's projections is for a 28-fold increase in EU e-commerce revenues through 2004 with total B2B and B2C revenues forecasted to reach almost US$2,600 billion. Closer to home, in the Asia Pacific region outside of Japan, B2B e-commerce transaction value will grow at a compound average growth rate (CAGR) of 155% from 1999 through 2004.

Still not convinced?

In the quarterly e-commerce survey conducted by IDA, Singapore's B2B and B2C sales revenue grew by 26% and 13% respectively from Q1 to Q3 last year. By year-end of 2001, IDA estimates a total of S$112 billion sales revenue for B2B and S$2.58 billion for B2C.

Further studies also revealed that the Asia Pacific was the main source of global B2B and B2C e-commerce revenue with a 53% share. North America is next with 29%.

These figures tell of a new economy; one that is without border. One that is without a continent. Is the construction industry ready to whole-heartedly embrace this change and adapt to new technologies and a new marketplace?

3 The e-Marketplace in the e-Economy

There would be new business rules, strategies, management, and structures. It is a whole new world. The e-marketplace is paperless, without bounds and transcends borders. In this invisible continent, size does not matter. There is a level playing field for small, medium and large sized firms. However, the middleman in the supply-chain (builders merchant, retailers and distributors) is under threat. Buyers now can connect directly with suppliers and they are spoilt for choice given the ease of both pricing and information access.

Let's look at several salient issues that we need to chart our future path.

A) Reconfiguring business strategies
On the external, the world is your customer. Customer base would not be confined to the region or just to the Asia Pacific continent. Anyone, anywhere can be your customer. Internally, there is a tremendous need for staff personal development and growth.

Through the Internet, one of the most valuable commodity can be traded instantly – information.

B) Management restructuring
The traditional top-down management hierarchy will be a thing of the past. Management structures would be leaner and flatter. By cutting out unnecessary layers, front-line staff can have direct access to senior executives and not have their initiatives stalled.

United Parcel Service (UPS) has a decentralised system, which empowers district managers to make key decision. During the dark day in the history of mankind, 11 September 2001, this system was vital in UPS role of delivering medical supplies to hospitals.

C) Rethinking business operations
UPS core business was to deliver goods. Today they go far beyond delivering packages. They offer their customers maximum efficiency and cost control by outsourcing a variety of supply chain functions, whether it requires the movement of goods, information or funds. Logistics, financial services, global freight, mail services and consulting are parts of UPS Supply Chain Solutions.

Bottom line is that firms in the construction industry need to streamline into a seamless integrated function. Some consultant and contractor firms have already begun on this journey by getting their design work done in their firms in countries like India and Philippines where it is relatively cheaper and through the Internet, viola! The work is back at your desk in Singapore.

D) Changing work patterns via Enterprise Resource Planning (ERP)
What is ERP? It is to enhance organisation productivity by re-engineering the tools and workflow processes required within an organisation. Why waste human resource when software can do the job for a third of the cost? Knowledge management including customer and business intelligence and real-time applications will greatly increase organisational productivity as firms try to extract more value from their existing IT investments.

In Singapore, the construction industry will soon benefit from the EAMARP (Enterprise-wide Automated Management and Resource Planning) system developed by CORENET (Construction and Real Estate Network).

E) Replanning workspace
Who needs an office today? You could be at a wireless hotspot café sipping your espresso while having an on-line forum for discussion or commenting on some design issues on a project website.

Taking advantage of e-commerce will inevitably affect working patterns at all levels. As more people work away from the office and basic functions are outsourced, future space needs can be redefined. A decline in office space demand – potential worry for developers? Shifting your firm's office to less expensive outer city areas?

F) Altering Shelf Live

There are few people who are masters of all skills – from how technology works to ingenuity, intuition and business management acumen. Just as products have a shelf life, so is our domain knowledge. What may work yesterday may not work today. We need to source or develop within people to be more IT savvy and in tune with the e-economy. We should also adopt *"Just in Time Delivery"* to optimise shelf lives of products and services as space and time are expensive commodities.

4 E-Construction

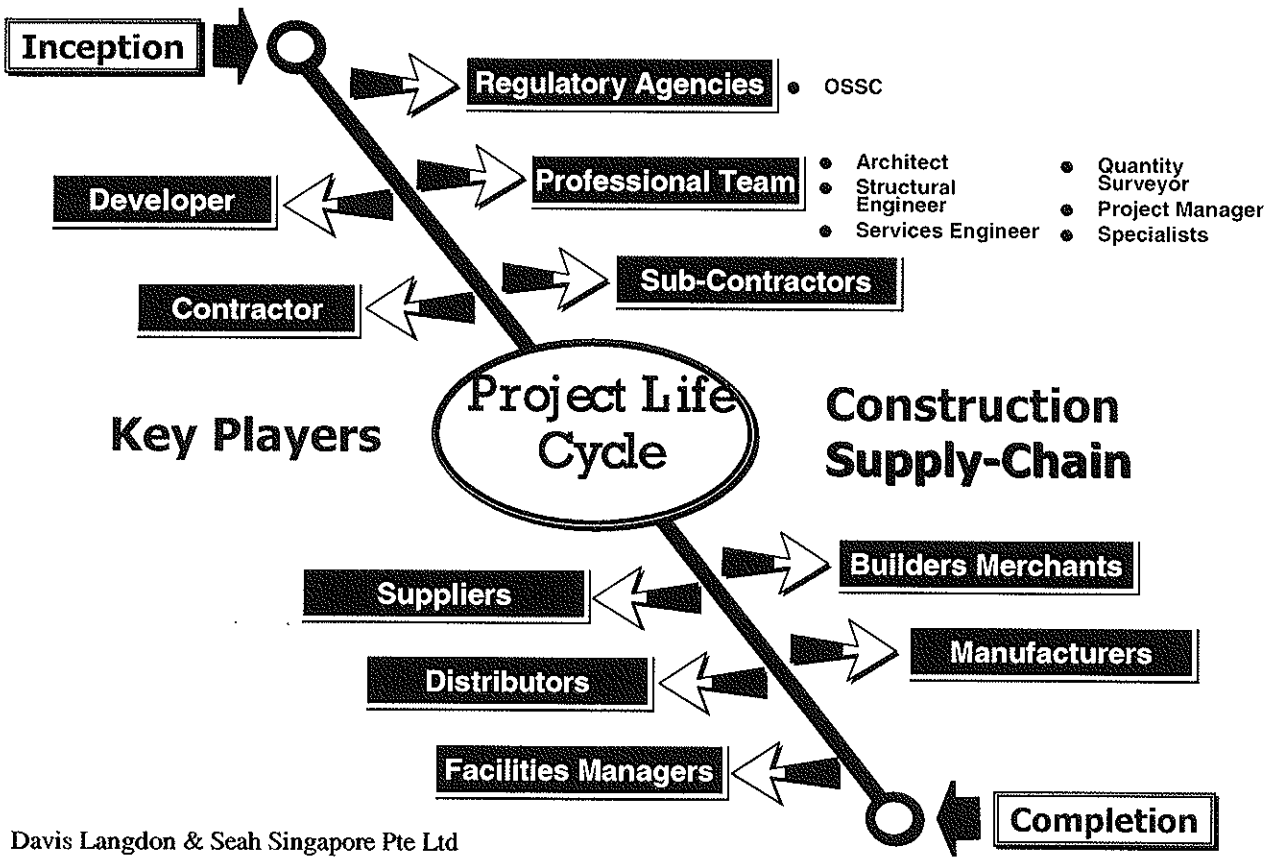


Figure 1 shows the Key Players in Construction Supply-Chain

The nature of the construction industry can be described as:

- Heavily fragmented
- Diverse
- Characterised by a number of small and medium sized firms

The use of Information Technology in the industry will dispel and reduce the inherent drawbacks and inefficiencies of the industry. IT will foster better links between the players, keeping them well connected via the Internet. Good and excellent co-ordination between the players has become a reality.

Imagine the quantum of business that can be generated between the various parties through e-commerce. From the initial procurement to construction to final hand-over, hundreds of activities and transactions would be communicated, performed and concluded daily for a project to achieve set targets on time and cost.

The scope of e-commerce in the industry is enormous and our direction must be charted towards it. For most construction firms, e-economy is B2B. Recognising the immense benefits that can be gained, various industry-driven initiatives have been developed to integrate the supply chain and streamline operations through e-procurement.

E-procurement saves time by eliminating tedious tasks of manual searching of suppliers names through bulky catalogues, sending tender invitations and subsequently reviewing and comparing quotations, hence improving productivity and lowering procurement costs.

Building and Construction Authority's CORENET is a major IT flagship program for the building and construction sector. The initiatives of BCA include:

A) ISS (Integrated Submission Systems)
A network infrastructure that provides a one-stop convenience for the submission and processing of documents for issue of approvals and permits through the medium of the Internet. By 2003, the Integrated Building Plan Checking System and Integrated Building Services Checking System will be available. Two more systems namely; the Integrated Structural Plan System and the Integrated External Work System are in the pipeline.

B) NPQS (National Productivity Quality Specification)
A national specification of ours will have a web-based graphical user interface (GUI) which will allow the transfer of specification information over the Internet. This will further enhance the effectiveness of the ISS. Ideally, the design input into CAD drawings by the design consultants should include data on the specification and other attributes. This will greatly assist the generation of bills of quantities by the QSs.

C) CEMS (Construction Electronic Measurement Standards)
Next, we have the electronic version de facto SMM (Standard Method of Measurement) of the QS fraternity, the CEMS. CEMS aims to enable easy exchange of data and information between itself, NPQS and CAD drawings and files. Furthermore with E-Prequalification, contractors now submit only one set of information and interested consultants or owners can easily scan through the information and make their selections thus yielding higher productivity levels.

D) DOL (Design Object Library)

Draughtsmen of the yesteryear would wish that they had lived in this era instead. Designing and drawing have been made easy. With DOL, a model is easily generated and amendments will be updated automatically throughout the documentation. Settings like height, width, and style can be changed countless times. This software too can generate a list of elements and a report that tabulates the quantities and cost.

E) Internet Based Project Collaboration Tools

In reality, the industry is an elaborate exercise in communication. Though the players are geographically dispersed, they must have constant contact and co-ordination. An Internet based project collaboration tool will achieve this need. It acts as a hub for projects documents to be stored, viewed, modified and updated. Project management, co-ordination and monitoring can be conducted easily, fast and securely.

F) EPEC (Electronic Procurement Environment for the Construction industry)

The objectives of EPEC is to:

- Set appropriate industry standards
- Re-engineer business processes for greater efficacy while eliminating redundancies
- Raise the overall level of computerisation and IT proficiency of the industry.

The benefits of E-Procurement have been discussed earlier.

G) AQTS (Automated Quantity Take-Off System)

A Quantity Surveyor's dream come true. Gone will be the tough days to manually take-off the quantities. However, at this juncture, no ATQS software has been written yet. At the moment, there are only quasi-AQTS softwares in the market; meaning these software perform other functions as well rather than on purely taking-off functions. It will be just a matter of time though, that the QS's dream will be a reality.

With all these tools, tenders too would be conducted via the Internet. Worried over security issues? Fear not as the BQ is based on CITE format and digital certificates are used to ensure the integrity and authenticity of the electronic documents. There is also 3D virtual tour software incorporated on the property-related websites allows potential buyers to view and "walk" through their dream homes at a click of a mouse.

"*Anytime and Anywhere*", that is theme of e-construction.

Businesses have no longer a choice but to compete more aggressively on value-added offerings and services and above all, client care. While there is a galore and abundant whole new world of opportunities, unfortunately the construction industry is not known to lead the bandwagon to accept change and the new economy.

The many firms in the construction industry with their roots in the old economy, needs to explore the new continent if they want to grow. If they remain in the old world, they can only thrive by cutting costs and laying off people.

Whatever the apparent resistances to change be it the industry profile, implementation cost, legal and security problems, the fear of job loss, national barriers etc, the construction industry has to chart its future direction towards the e-economy to reap higher productivity, cost savings and increased efficiencies or face demise.

5 What's Ahead?

Terminologies like 3G and GRPS (Global Radio Packet System) have become household words in the Asia Pacific region especially in Japan. With its launch here, mobile phones which is already an ubiquitous sight in Singapore (market penetration projected to reach 90% by 2005) will come with all the features and functions of a PC and PDA. This would give birth to another dimension of commerce called m-commerce (mobile-commerce)

For the construction industry, it means that drawings, emails, e-documents can be transmitted and received via the mobile anywhere, anytime, be it during a site meeting, in the car, at the shopping mall – everywhere. Fast, instant, extremely mobile and light (without lugging a bulky laptop around).
Knowledge, connectivity and "going the extra mile" will be the new rules for businesses in the future. Along this path too, will there be huge challenges and endless opportunities. The construction industry will be affected in all dimensions and activities from business planning to information sharing to project management.

E-commerce will continue to grow and gather momentum. The construction industry needs to accelerate implementation plans and strategies to be able to participate in this invisible continent and its e-economy.

6 Conclusion

The invisible continent has dawned on us. It has unleashed upon us a new way to work, do business, interact and live. We have to deal with these changes – as an individual, a company, an industry, a country, a government and everyone of us as an international citizen.

The construction industry simply cannot afford to lose out on opportunities such as, new services, new clients, new kind of competition (where metaphorically speaking, how a piranha eats a shark), a globalised marketplace and e-economy businesses (small, IT savvy, very mobile, customer orientated and budget-sensitive start-ups).

The future is here and is now. Let's chart our industry's direction to move into this new realm of the invisible continent.

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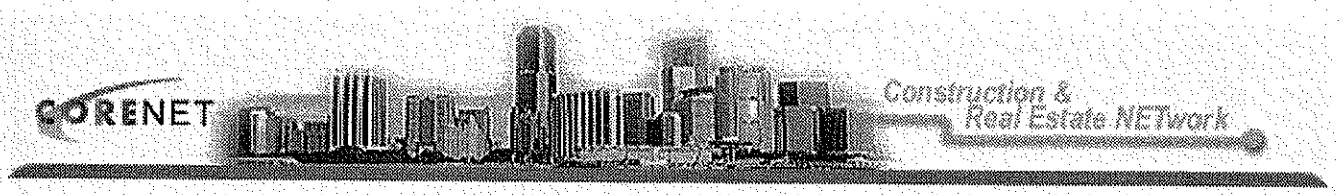

IT Seminar 11
Re-inventing Construction with IT Standards and Digital Technologies

Making SS CP83 compliance easy: An architect's experience

Presented by

Mr Kevin Chua Chin Shun
Assistant Architect
C&C Chartered Architects

A User's Point of View

Kevin Chua

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Contents:

- **Background**
- **Parts I - V**
- **Implementation**
- **General Feedback**
- **What's Next**

Background : Formation & Objective

- CORENET CAD & Classification Standards
- MOU Signed
- 29/09/1998
- Objective:

  "to improve the exchange of building information amongst the building professionals during the building lifecycle"

Developed under the ambit of Construction Industry IT Technical Committee (CITC) - an industry-led committee comprising members from various professional bodies and leading firms in the industry

Background : Phases

- 2 Phases

Phase I:
define the standards for current IT tools such as the geometry based CAD software used for drafting purposes by the industry today

Phase II:
define the standards for emerging IT tools such as the model based CAD software. Such standards will be defined in conjunction with an international effort known as the International Alliance for Interoperability, IAI (S).

Background : Phase I

- CAD Standards
  - Layering - SS CP 83 Part 1: 2000
  - Symbols - SS CP 83 Part 2: 2000
  - File Names- SS CP 83 Part 3: 2001
  - Drafting Convention - SS CP 83 Part 4: 2001
  - Colour and Linetype - SS CP 83 Part 5: 2001

Mandatory for Government Projects by July 2002

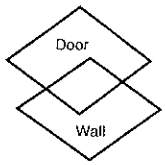
Status

- Are Approving Authorities Ready?
  URA, BCA, FSSB, LTA, CBPU, PWD
- How about the Private Sector?
  Architects, Engineers, Contractors, etc

CP83 Part I : Layer Standards

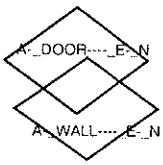
Layers

A method of organising information in a CAD Drawing



CP83 Layer Standards

- 16 Characters
- Formerly max 6 characters



— : *A User's Point of View*

CP83 Part I : Layer Standards

- Based on ISO13567 Standard
- 16-character field



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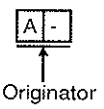

Architect	EquipmeNt Supplier
Civil Engineer	Structural Engineer
Electrical Engineer	Telecomunications
Land Surveyor	Other Disciplines V
Mechanical	Contractor X

— : *A User's Point of View*

CP83 Part I : Layer Standards

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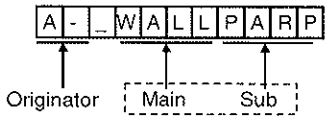
- 16-character field



"Parapet Wall"

→ : *A User's Point of View*

CP83 Part I : Layer Standards

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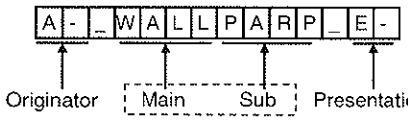
- 16-character field



Element Graphics	**E0** Plan
-Whole Model	**E1** Elevation
Model	**E2** Section
Annotation	**E3** 3D View
Paper	**ED** Detail .....

→ : *A User's Point of View*

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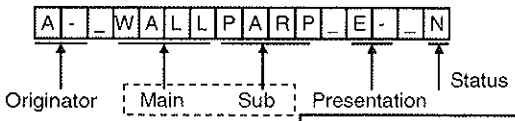


New Work
Existing to Remain
Existing to be Removed
Existing to be moved, OriginalPosition
Existing to be moved, Final Position
Temporary work

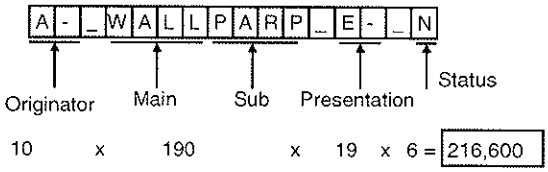
→ : *A User's Point of View*

CP83 Part I : Layer Standards

- Based on ISO13567 Standard
- 16-character field

A	-	_	W	A	L	L	P	A	R	P	_	E	-	_	N

Originator Main Sub Presentation Status



10 x 190 x 19 x 6 = 216,600

CP83 Part I : Layer Standards

- Resistance from Drafting personnel
- Require retraining
- Even so, still can get wrong
- Make use of add-on application
- Auto-Convert in-house layers to CP83

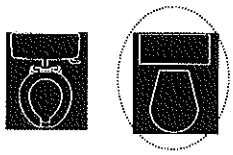
CP83 Part I : Layer Standards

- Implications of using wrong Layer?
- Who is responsible? Liable?
- Are other professionals implementing CP83?
- Land Surveyors don't seem to have caught on..

CP83 Part II : Symbol Standards

Symbols

A simplified way to represent something abstract or real



- 198 Architectural Symbols
- 524 M&E Symbols
- Which Symbol to use?
- What layer to put on?

CP83 Part III : CAD File Names

- Firms have spent time & money for in-house std
- Written in ISO manual
- New CAD file names difficult to use
- Old Name: Site Plan
- New Name: 58_A-SP-----A-
- 2 other formats: A-SP---A or 58SP---A

CP83 Part III : CAD File Names

- Very complex and beyond most users e.g.:

EW00_A2FP31B2C-

File of **E**ast **W**ood project in year 20**00** prepared by second architect **A2** containing **F**loor **P**lan at level **31** of zone **B2** and is the third version **C-** of file

CP83 Part IV : Drafting Conventions

- Relatively easy compared to the rest
- Also not as critical
- Standard sheets, hatch patterns etc
- Standard Abbreviations

CP83 Part V : Colour and Linetype

- Continuation of Layer Standard
- Defines Colours and Linetypes to be used
- Main purpose to make it easy for Authorities
- For visualisation especially A&A / ammendments
- But Architects use Colours for plot pen widths
- Most of the layers are in white

CP83 Part V : Colour and Linetype

- Supposed to use Line Weights in CAD
- Available in ACAD 2000+, Microstation, FastCAD
- R14 and below and ICAD doesn't support
- Need routine to swap in-house colours to CP83

Implementation

- Not too many firms are really ready
- Implementation is not easy
- It is indeed more complex than before
- BCA has INTECH subsidised training
- Definitely need add-on like [illegible]
- Perhaps there is a need to simplify this

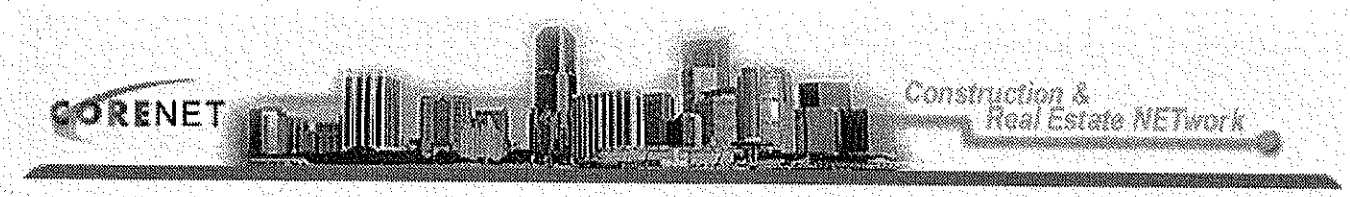
General Feedback

- Still too early as not many have gone on-board
- BCA will definitely look at comments & feedback
- Hopefully we can fine-tune the system
- Of course, if everyone using, will be good
- Most firms will ask for Grants to get started

What's Next?

- We have barely started
- IBP or Object Oriented CAD ?
- How will this affect us?
- Do we need to "re-invent" again?
- Let's take it a step at a time..

Thank You!



IT Seminar 11
Re-inventing Construction with IT Standards and Digital Technologies

Preparing You for Electronic Submissions

Presented by

Ms Genevieve Tan
Technical Consultant
Building and Construction Authority

CORENET
e-Submission

Presented By:

Genevieve Tan
Technical Consultant
Building and Construction Authority

Agenda

- Objective
- Introduction to CORENET
  (COnstruction and Real Estate NETwork)
- The CORENET e-Submission System (eSS)
  - Industry Concerns
  - Compelling Benefits
- Summary

Objective

For participants to have an appreciation of the CORENET e-Submission System (eSS).

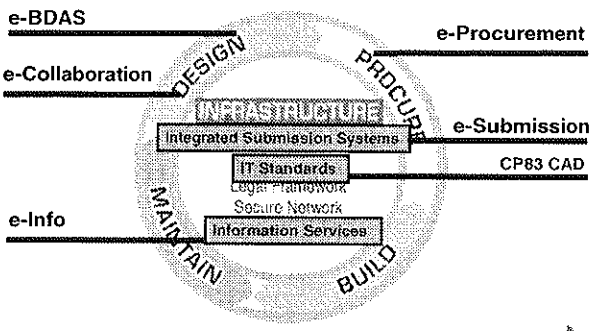
Participants should come away with:

- ☑ Concerns addressed
- ☑ Benefits explained

Introduction to CORENET

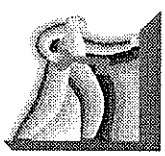
- Stands for Construction and Real Estate Network.
- Major IT initiative led by MND.
- Driven by BCA in collaboration with both the public and private organisations.
- Objective is to re-engineer the business processes of the construction industry.

Introduction to CORENET



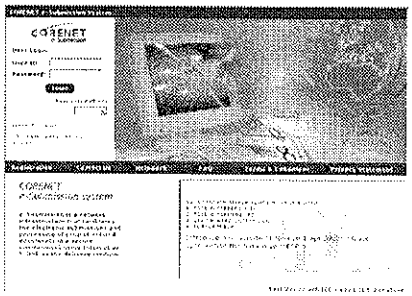
CORENET e-Submission System

- Government to Business (G2B)
- Internet-based portal
- Specially designed for industry professionals
- Submit project related plans and documents to regulatory authorities



CORENET e-Submission System

http://www.corenet-ess.gov.sg



Industry Concerns

Is the Setup Requirements Very Complex?

Setup Requirements Very Simple

Hardware:



- Pentium PC with at least 400 MHz
- Minimum 64 MB RAM
- Broadband connection
- Minimum 1GB hard disk capacity
- Netrust Smartcard Certificate ver 3 (**Free!** for early adopters)
- Smartcard Reader

Setup Requirements Very Simple

Software:

- Windows 98 and above (bundled with PC)
- Microsoft Internet Explorer ver5.x browser or higher (**Free!**)
- ESPro application (**Free!**)
- InternetForms Viewer v4.4.x or high (**Free!** for early adopters)
- Digital Signer application (**Free!** for early adopters)

Others:

- EDAForm application offline module(**Free!**)
- JRE 1.3 (**Free!** with the EDAForm application installation program)



Industry Concerns

Is it an Intelligent Plan Checking System?



Intelligent Plan Checking it is NOT

Answer:

- **It is NOT an Intelligent Plan-Checking System to check all the details of your plans before it allows you to submit.**
- **Therefore, there is NO NEED to purchase any special CAD software for eSS.**



Industry Concerns

Is it Very Expensive to Use?

Expensive? Not at All.

Answer:

- **eSS is not costly, in fact, it Saves!**
- **Even for the small design practices**
- **Saves lots of overheads in printing and despatch**
- **Greater intangible savings, e.g. time.**
- **It costs you money NOT to use eSS.**



Example Illustration:

Amount of Savings eSS saves!

Expensive? Not at All.

Example Illustration:

Estimated Savings (for small projects) :

Savings in printing of hard copy drawings for ONE submission (exclude re-submissions)	$105 - $360 per submission
Savings in despatch for one submission	$15 - $90 per submission

BACK

Expensive? Not at All.

Items	Set up	Recurring
1. Registration with licensed Certification Authority (e.g. Netrust)* • Applicant will be issued with an identity card	$85	$50/yr
2. Smart Card reader	$55	$0
3. High-speed Internet connection**	$150	$100/mth
4. Form filling tools***	$200	$30/yr

* early adopters will receive the certification authority registration license free of charge

** figure varies between ISP providers. The estimated are for low usage of 2GB per month schemes

*** early adopters will receive the form tools free of charge

Industry Concerns

Is it
Very Different
from URA's EDA?

eSS & EDA? Almost Same, However ..

Answer:
Generally the same. However there are some differences, which includes:

No.	Area	eSS	EDA
1.	Participating Agencies	13 Participating Agencies	URA Only
2.	Digital Signing using Netrust Card	Option of Individual / multiple files	"Blanket" Signing of a Folder To check their submission status.
3.	Submission Sending	Files are packaged before submission.	Files are sent in bulk

eSS & EDA? Almost Same, However ..

Participants:

Participating Regulatory Authorities :
- Building and Construction Authority
- Urban Redevelopment Authority
- Land Transport Authority
- Public Utility Board Water
- Singapore Power
- Housing & Development Board
- Jurong Town Corporation
- Fire Safety And Shelter Bureau
- Central Building Plan Unit
- Infocomm Development Authority
- National Parks Board
- Maritime and Port Authority
- Energy Market Authority

Industry Representatives :
- Singapore Institute of Architects
- The Institution of Engineers
- Association of Consulting Engineers
- Real Estate Developer's Association
- The Singapore Contractor Association

Electronic Submission System

Industry Concerns

Does it have a Very Complicated Workflow?

Workflow? Quite Straightforward

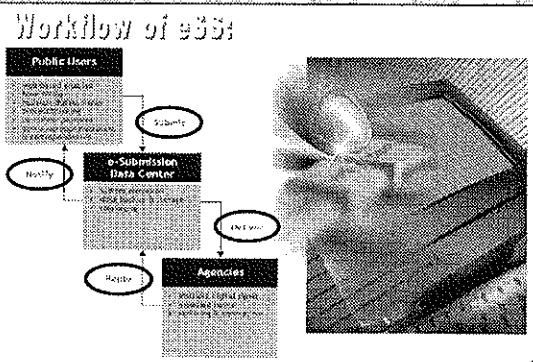
Answer:

Workflow Illustration



Workflow on eSS

Workflow? Quite Straightforward



Electronic Submission System

Industry Concerns

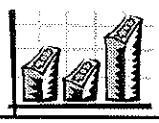
My Finances are Tight. Any Help?

Tight Finance? We're Here to Help.

Answer:

We have Incentives Schemes to assist you financially.

- **INTECH (Initiatives in New Technology)**
  - **eSS Hands-on Training Grant, up to 70% of fees.**
- **Jumpstart Construction**
  - **Grant for IT setup, up to 50% or $20,000.**



Compelling Benefits of eSS

- Easy Preparation for Plans Submission
  - Minimize repeated data entry
  - Easy authentication of Documents with Digital Signatures
  - Convenience of working from individual PCs
  - Digital storage of essential form templates in PC
  - Reduced printing of hardcopies
  - Minimize storage space for hardcopy prints



Compelling Benefits of eSS

- Absolute Convenience of Plans Submission
  - No Time Constraint
  - Submit anytime, from anywhere (via Internet Connection)
  - Time and money saved by reducing traveling time to multiple agencies.
  - Instant notification of successful submission (via electronic mail)



Compelling Benefits of eSS

- One-stop Tracking of Submission Status
  - Single point of contact
  - Can be done online (via Internet Connection)
  - Enables the QP to appoint an alternate personnel to be notified of any correspondence from the agency.
  - Central repository of approved plans



Summary

- Introduction to CORENET
- CORENET e-Submission System
  - ✓ Industry Concerns
  - ✓ Compelling Benefits



Need to Know More Information?

Industry Briefing

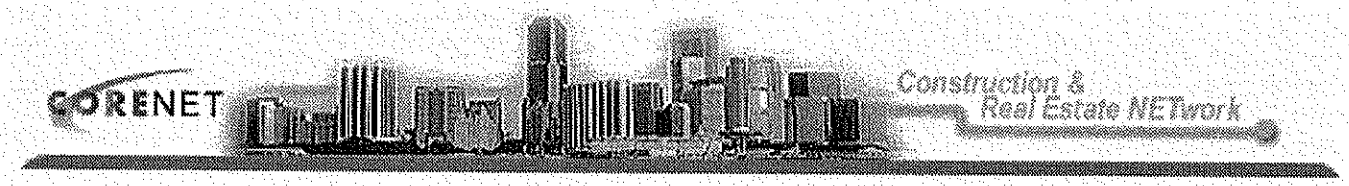
@ 2pm



Need to Know More Information?

Training Classes:

- Course content includes hands-on training on:
  - ✓ Registering as CORENET ESS user
  - ✓ Download software from ESS
  - ✓ Using ESPro
  - ✓ Using Online CORENET ESS functions
- Details are posted on <http://www.corenet.gov.sg>
- April, May & June classes open for registration.
  - April ~ full
  - May ~ 70% filled
  - June ~ 40% filled



IT Seminar 11
Re-inventing Construction with IT Standards and Digital Technologies

Transforming the Standard Method of Measurement to a National Construction Electronic Measurement Standard

Presented by

Mr Seah Kwee Yong
Chairman, Measure Work Group
Construction Industry IT Standards Technical Committee

Transforming SMM to a national CEMS

BY SEAH KWEE YONG, CHAIRMAN, MEASURE WORK GROUP

CEMS

1. The SISV proposed Standard Method of Measurement of Building Works 3rd Edition (SMM3) would be nationalised as Construction Electronic Measurement Standards (CEMS) and would be Singapore Standard (SS) Code of Practice (CP) to facilitate development of compliant software to automate upstream resources quantification activities to enable seamless downstream online procurement of construction products and materials.

2. CEMS will form the basis for enabling seamless migration of data from architectural and engineering design, based on the object oriented CAD technology and the to-be-developed National Productivity and Quality Specification (NPQS). By establishing common protocols and terms, which are critical for the development of proprietary and commercial software capable of interfacing and synthesising both upstream contracting procurement activities.

3. Part 1 for the General Building portion will be developed by end of year 2002 and Part 2 for the M&E building services portion will be developed immediately after. Leading QS firms, DLS and KPK jointly, had been appointed by the Singapore Chapter of the International Alliance for Interoperability [IAI(S)] in August 2001 to develop the standard. DLS-KPK will deliver Part 1 for General Building in the first instance. The delivery of CEMS will be subject to endorsement by the Measure Work Group (MWG) which has representation of the major industry institutes and associations as well as one round of public comment.

4. By Aug 2002, we hope that public comments could be sought and training in consultation with NUS, Singapore Polytechnic will be arranged to prepare the local industry, in particular, Quantity Surveyors employed at every part of the value chain for the adoption of the new standards.

Role of MWG

5. Under the leadership of Information Technology Standards Committee (ITSC) and Construction Industry IT Technical Standards Committee (CITC), 2 construction IT related workgroups were formed:

a. Design Workgroup (DWG) on CAD related issues led by SIA and IES (developed Code of Practice 83 CAD File Name structure, symbols, layering, drafting conventions, colour & line type, etc.) and

b. Procure Workgroup (PWG) on procurement related issues led by SISV and SCAL (developed Code of Practice 80 Construction Cost Classification, and developing the proposed code of practice: Construction Resource Classification Standard (CRCS).

6. Further sub-workgroups were also formed for various projects to improve industry Practices and Techniques. ITSC and CITC has entrusted IAI(S) to jointly co-ordinate the adoption of IT standards for the construction industry.

7. The Measurement Workgroup (MWG), which is SISV-led, is a sub-group of PWG. The current project of MWG is to introduce CEMS for the construction industry so as to facilitate the linkages/interfaces to CAD standards, Industry Foundation Classes (IFC), National Productivity Quality Specification (NPQS), Automated Measurement Applications development, Construction Cost Classification (SS CP80) and Construction Resource Classification Standards (CRCS). CEMS will be a new SS CP and thus nationalises the SMM.

Scope of Review

8. CEMS will leapfrog the current Standard Method of Measurement (SMM2) used for quantity surveying into Information Technology age, integrating the upstream e-design environment with the downstream e-tendering and e-procurement.

9. CEMS objectives outlined by DLS-KPK include

a. Facilitating the development of automated quantities application software;

b. Enabling easy exchange of data between CEMS, NPQS and CAD files;

c. Providing a relational mapping between CEMS and CRCS; and

d. Reviewing and replacing current SMM2.

10. DLS-KPK's Requirement Study had included

a. Visits to Architectural, Structural and M & E consultants, and ascertaining contractors' procurement processes, both main and subcontractors' and also suppliers'.

b. Analysis of Standards and Reference Documents which cover Singapore SMM2, UK SMM7, Uniclass, Masterformat, SS CP 80 Cost Classification, and SS CP 83 CAD Layering.

c. Analysis of Automated Quantities Application Software which includes reviewing of CAD drafting software; Engineering Software; and existing automated quantities application software and reviewing relevant IT technology, which includes Industry Foundation Class, CAD Object Modelling, Relevant XML and SGML technology for web applications.

Origin of SMM

11. The 1st edition of SMM was introduced in 1959. An extract from this SMM1 preface is as follows:

> Since the introduction of the use of Bills of Quantities (BQ) to the Building Trade in Singapore and Malaya, as from the early nineteen thirties, THE STANDARD METHOD of MEASUREMENT of BUILDING WORKS, as published in England by The Royal Institution of Chartered Surveyors, has been adopted as a broad basis for measurements, with modifications to suit the individual requirements of Contracting Departments or the demands of local conditions and practice.

However, until then, these modifications have never been agreed or standardized among Quantity Surveyors. Consequently, Surveyors in Government and Service Departments and in private practice have been measuring, classifying and describing virtually the same items of construction in various ways, each Surveyor either trying to keep to an accepted style and practice set by his predecessor, or, very often, trying to introduce what he considers to be a better method or system.

The need for standardisation is therefore very obvious and has been felt for a long time then. In fact, an unsuccessful attempt was made to draw up a Revised Standard Method of Measurement for Singapore and Malaya before the Second World War and in 1956 the War Office issued Rules of Measurement to Standardise Bills of Quantities in respect of work for the War Department, Admiralty and Air Ministry, but they were intended only for Departmental use.

In September, 1957, a Sub-Committee of the then Malaya Branch of the Royal Institution of Chartered Surveyors, comprising members of long experience in the Federation of Malaya and Singapore was formed, with the authority of the Institution, to revise and alter the English S.M.M. accordingly to suit our local needs and practice. This first Edition was the result.

Primarily, the English Standard Method of Measurement (4th Edition) remains the basis of SMM1. The Sub-Committee did not attempt to re-write completely the English SMM4. but generally deleted non-applicable items and items of minor importance, especially those involving labour only and incorporated them into other major basic items and added new items to suit our local labour requirements and trade practices.

In effect the principles of measurement and description established therein amount to an amalgamation or compromise of the practices of Surveyors in the Government, War Department, Admiralty, Air Ministry and private firms.

In submitting the First Edition of the Standard Method of Measurement of Building Works for Use in the Federation of Malaya, Singapore and Borneo, the Sub-Committee stated that it was the expressed wish of the Branches of the Federation of Malaya and Singapore that it would be adopted by all Quantity Surveyors in the designated areas upon its official publication.

12. A local standard was in effect formed in 1959. It is incidental to note that the chairman of the 1st edition Committee was Mr Seah Mong Hee.

13. The SMM1 was reviewed in 1986. An extract from the preface of SMM2 is as follows:

Over twenty-six years have elapsed since the Standard Method of Measurement of Building Works was first published in November 1959. The document has been well received by all the principal parties involved in the construction industry.

Changing technology in methods of construction, and new materials and processes have, however, rendered various provisions in the Standard Method inadequate or obsolete. Experience obtained from the use of the document has also pointed to the need for amplification and clarification of some of the clauses. Hence, this Second Edition.

To ensure that the views from all interested parties are considered, the SMM Revision Committee had sent the draft of the revision to various bodies and institutions and all Quantity Surveying members of the Institute for their comments and suggestions.

14. The committee responsible for revision was: Farok Majeed (Chairman), Khoo Boon Keng (Honorary Secretary), Andrew Heng, Seah Choo Meng, Seah Mong Hee (Adviser and Editor).

Need For Transformation and Nationalisation

15. In this millennium IT age, the need to integrate for interoperability became obvious and the review cannot be done by the sector of Quantity Surveyors alone.

16. With the C21 mooting for collective championing effort, nationalisation became a necessity, to integrate the IT requirement upstream and downstream. It is thus inevitable that the proposed Standard Method of Measurement of Building Works 3rd Edition (SMM3) has to be nationalised into Construction Electronic Measurement Standards (CEMS).

17. The aim was in dealing with Quantification into Bills of Quantities to facilitate downstream procurement and the contract administration for variations.

18. Many may not be aware that each item description of Bills of Quantities were to be backed by specification clauses as an amplification to establish the costing level. The development of SMM and the traditional categorisation of specification clauses are therefore symbiotic.

a. Hence in UK/Europe – SMM is symbiotic with RIBA's National Building Specification (NBS).

b. In US - CSI MasterFormat is backed by the Construction Specifications Institute (CSI) in the United States. CSI MasterFormat works well with ASTM standards and seems to work well with more international systems. Non-commonwealth countries like Japan and Korea like to use this system too.

Concern on Parallel Development with NPQS

19. It is likely that NPQS would be a library of clauses for selection and editing to produce individual project specifications – Some call it Particular Specifications.

20. The clauses and guidance are provided in a range of work section libraries to suit most types of building work and all sizes of project (may be for Minor Works, Economical, Standard and Deluxe). Preliminaries for use are also provided with the appropriate libraries.

21. It would have sections and divisions to logically group many aspects of construction activity into a clear and easily recognised framework. It would have a system of numbers and titles for organising construction information into a regular, standard order or sequence.

22. Thus promoting standardisation and thereby facilitates the retrieval of information, improves construction communication, and helps to make buildings safer and more cost-effective.

Probable format for CEMS

23. CEMS needs to set a platform for Web-based contract documentation. It should hopefully work with the influence of both formats. CSI MasterFormat gave a friendlier approach and is clearer than the NBS format. NBS with the common work arrangement tends to use cross-reference by codes, which made it less user-friendly to work.

24. It is observed that lesser projects are using Bills of Quantities in UK, as performance based Design & Build form is getting more popular, the latter adopts lump sum tenders and stresses very much on budgetary control.

25. Although the traditional buildings are constructed in trades, more & more construction components are pre-fabricated (without trade demarcation), and performance quality are achieved in factory. For prefabricated components, although the unit quantification might be the same as traditional bill, the unit cost will differ if the production requirement is not modular.

26. CSI MasterFormat is product based. It is limitless to suit different level of hierarchic players in the construction industry.

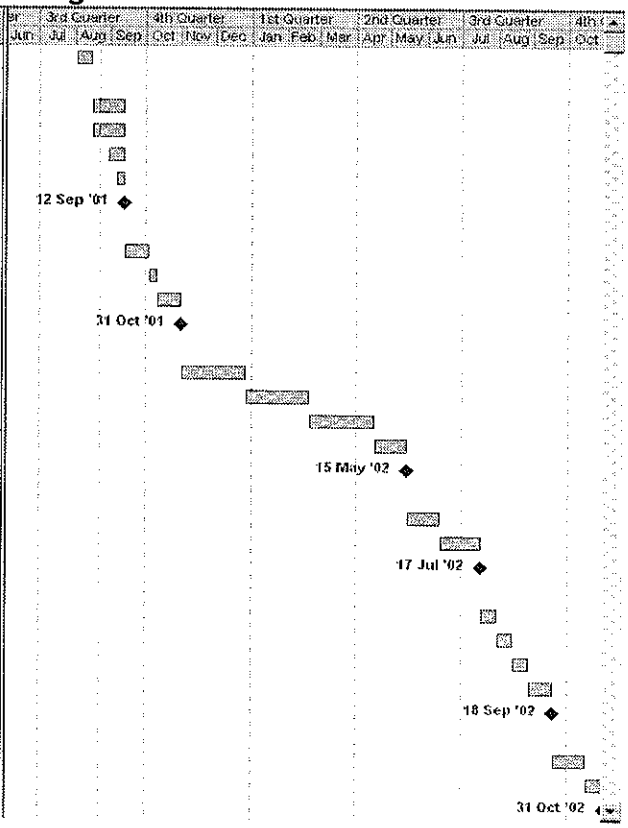
27. Our observation is that following Singapore adoption of the CSI MasterFormat classification system for its Construction Resources Classification Standard (CRCS) Code of Practice, it is likely that the CEMS classification for works would have to be expanded from CSI MasterFormat.

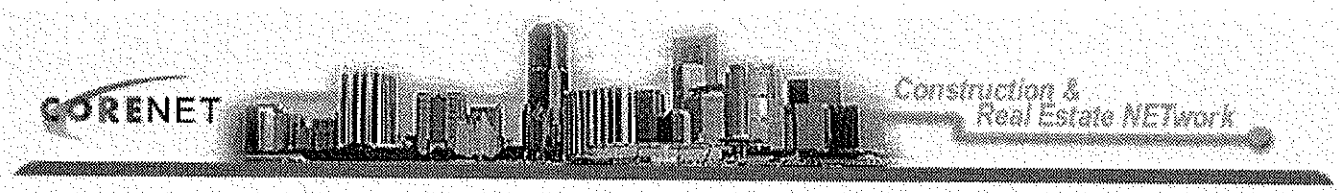
28. Although many of the UK trained QS are familiar with the UK Common Work Arrangement meant for SMM7, Singapore has not used the Common Work Arrangement under SMM2. We are therefore not constrained to consider adopting CSI MasterFormat. It would be easier to adopt a proven existing rather than modifications, which involve lots of re-writing and justifications.

29. Nevertheless, the recent NPQS development is advocating otherwise. Harmonising with each other is in process

Milestones for Part 1 CEMS - General Building

Task Name	Duration	Start
Preparatory Work	**2 wks**	**Wed 01/08/01**
Requirement Study	**4 wks**	**Wed 15/08/01**
Data collection	4 wks	Wed 15/08/01
Analysis of Standards & Reference Documents	4 wks	Wed 15/08/01
Analysis of Automated Quantities Application Soft	2 wks	Wed 29/08/01
Review of Relevant IT Technology	1 wk	Wed 05/09/01
Study Report	1 day	Tue 11/09/01
Framework Design	**7 wks**	**Wed 12/09/01**
Analyse and Collate Findings of Requirement Study	3 wks	Wed 12/09/01
Decide on Classification Standard	1 wk	Wed 03/10/01
Draft Overall Framework of CEMS	3 wks	Wed 10/10/01
Framework Proposal for CEMS	1 day	Tue 30/10/01
Development	**28 wks**	**Wed 31/10/01**
Draft BQ Items	8 wks	Wed 31/10/01
Draft Standard Phaseologies	8 wks	Wed 26/12/01
Draft Preambles	8 wks	Wed 20/02/02
Draft Guidance Notes	4 wks	Wed 17/04/02
Sample CEMS Bills of Quantities	1 day	Tue 14/05/02
Presentation and Feedback	**9 wks**	**Wed 15/05/02**
Present to Professional Institution	4 wks	Wed 15/05/02
Obtain Feedback from Industry	5 wks	Wed 12/06/02
Feedback Report	1 day	Tue 16/07/02
Refinement	**9 wks**	**Wed 17/07/02**
Evaluate Feedback	2 wks	Wed 17/07/02
Refine/Amend CEMS	2 wks	Wed 31/07/02
Publish for Public Comment	2 wks	Wed 14/08/02
Produce Final Draft	3 wks	Wed 28/08/02
Final Draft	1 day	Tue 17/09/02
Roll-out	**6 wks**	**Wed 18/09/02**
Finalise CEMS Document	4 wks	Wed 18/09/02
Seek Approval from Employer	2 wks	Wed 16/10/02
The CEMS	**1 day**	**Wed 30/10/02**





IT Seminar 11
Re-inventing Construction with IT Standards and Digital Technologies

Adapting Industry Work Processes during Tender Stage

Presented by

Mr Ho Swee Sun, Associate Director
KPK Quantity Surveyors (1995) Pte Ltd
Mr Eugene Seah, Senior Quantity Surveyor
Davis Langdon & Seah Singapore Pte Ltd

Construction Electronic Measurement Standards (CEMS)

Adapting Your IT Systems for CEMS

1

Objectives

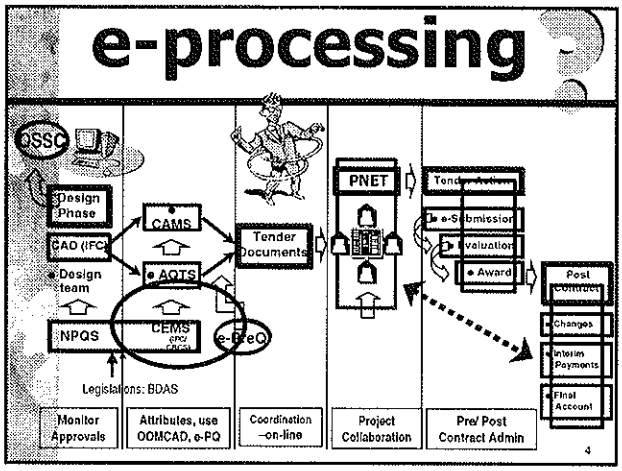
- Facilitates Development of Automated Measurement Software Applications
- Enables Easy Exchange of Data Between CEMS, NPQS and CAD Files
- Has to be IFC compliant
- Facilitate Contractors in their Procurement Exercise

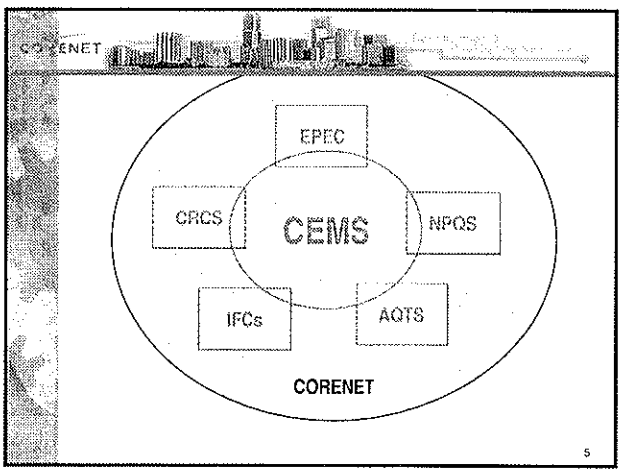
2

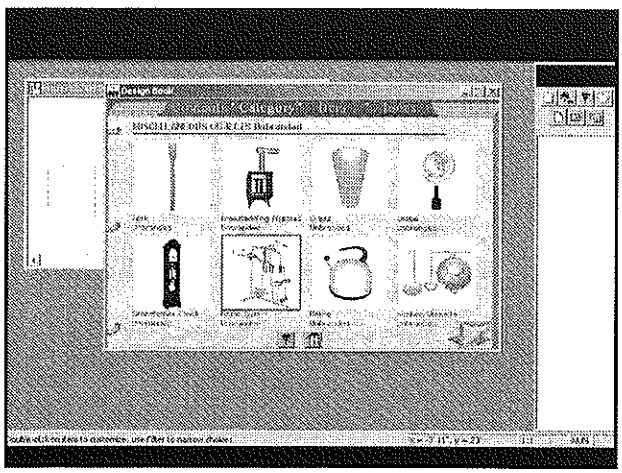
Who is Involved?

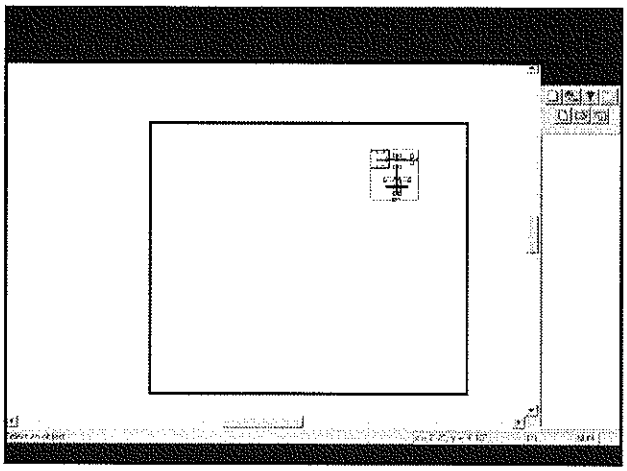
- International Alliance for Interoperability (IAI)- Singapore Chapter
- BCA
- CEMS Consultants
  - DLS
  - KPK

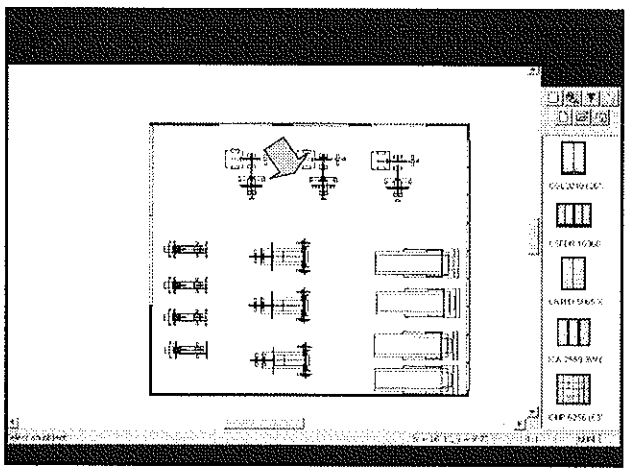
3

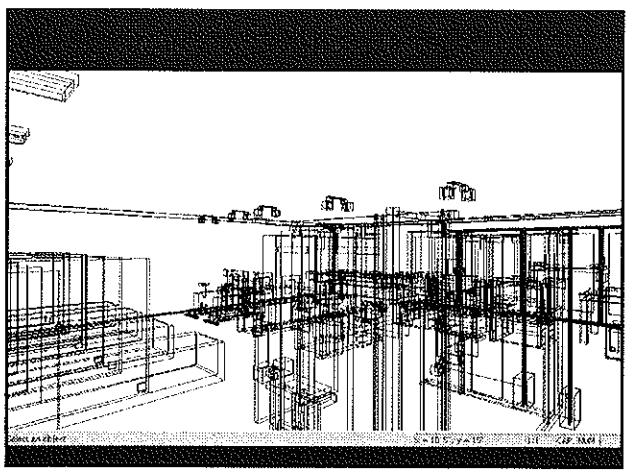

e-processing
OSSC
Design Phase
CAD (IFC)
Design team
CAMS
AQTS
CEMS
NPQS
e-BeC
Tender Documents
PNET
e-Submission
Evaluation
Award
Post Contract
Changes
Interim Payments
Final Account
Legislations: BDAS
Monitor Approvals
Attributes, use OOMCAD, e-PQ
Coordination -on-line
Project Collaboration
Pre/ Post Contract Admin
4

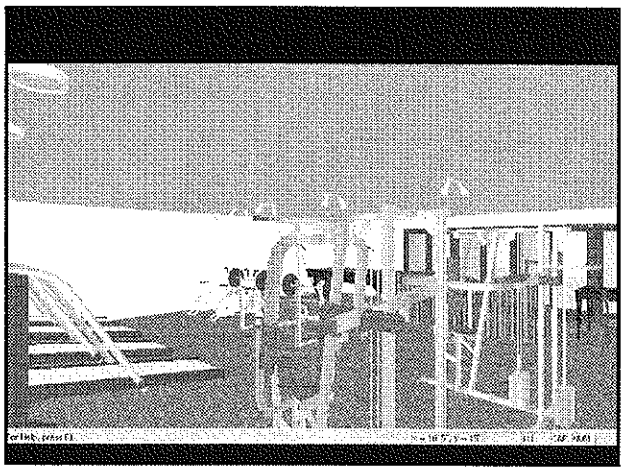

CORENET
EPEC
CRCS
CEMS
NPQS
IFCs
AQTS
CORENET
5

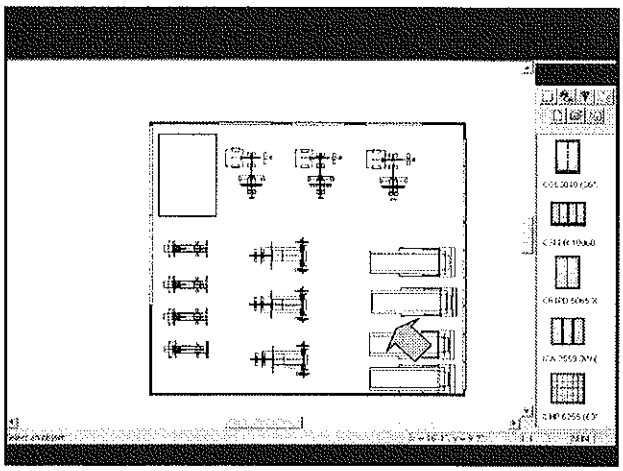


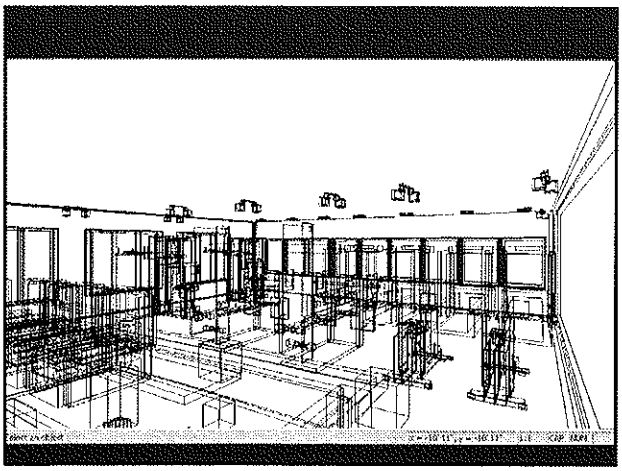


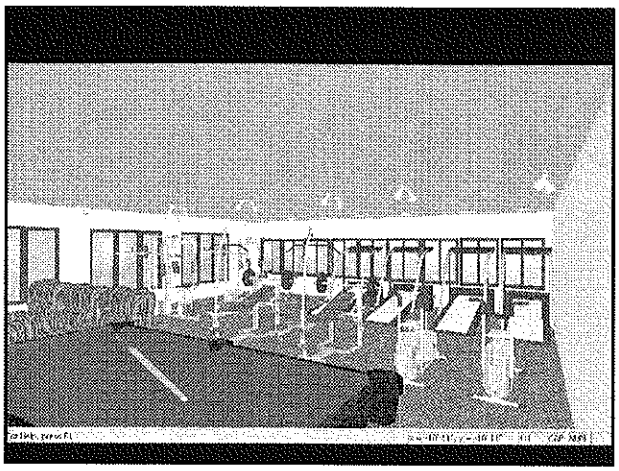


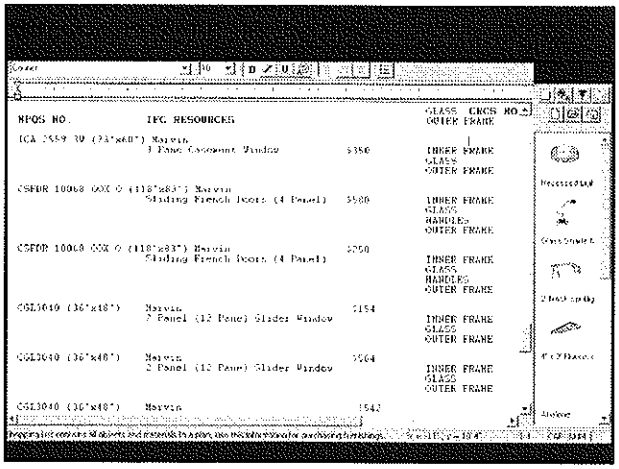











MPOS NO.
IPC RESOURCES
GLASS CROSS NO.
OUTER FRAME
INNER FRAME
GLASS
OUTER FRAME
INNER FRAME
GLASS
HANDLES
OUTER FRAME
INNER FRAME
GLASS
HANDLES
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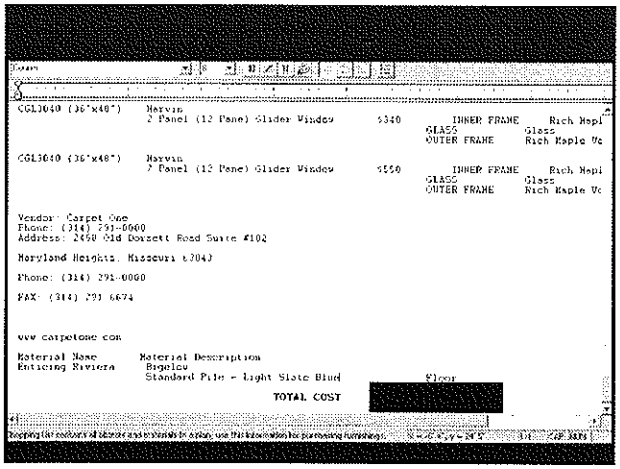
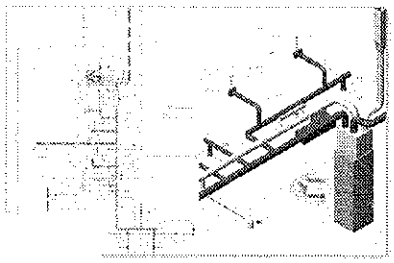
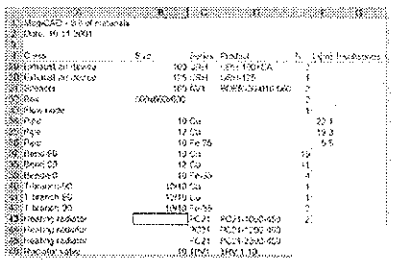
GLASS
OUTER FRAME


INNER FRAME Rich Mapl
GLASS Glass
OUTER FRAME Rich Maple Ve
INNER FRAME Rich Mapl
GLASS Glass
OUTER FRAME Rich Maple Ve
Vendor: Carpet One
Phone: (314) 291-0000
Address: 2450 Old Dorsett Road Suite #102
Maryland Heights, Missouri 63043
Phone: (314) 291-0000
FAX: (314) 291 6674
www.carpetone.com
Material Name
Material Description
Enticing Riviera
Bigelow
Standard Pile - Light Slate Blue
TOTAL COST





Analysis of Standards and Reference Documents

- Singapore SMM2
- Philippines SMM (Masterformat)
- UK SMM7 (CAWS)
- Uniclass
- Masterformat
- SS CP 80 – Construction Cost
- SS CP 83 – CAD Layering
- CPI
- CIOB: Code of Estimating

18

CEMS BRINGS TOGETHER

- CP 80
- CP83
- CRCS
- CPI

⟺

- ODBC
- CSV
- IFC
- CITE

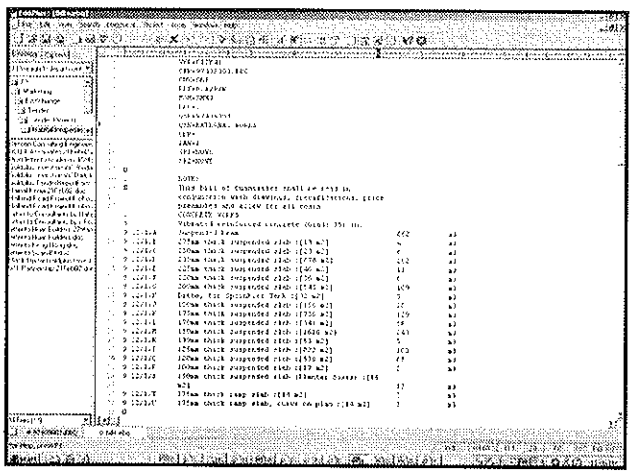
CEMS

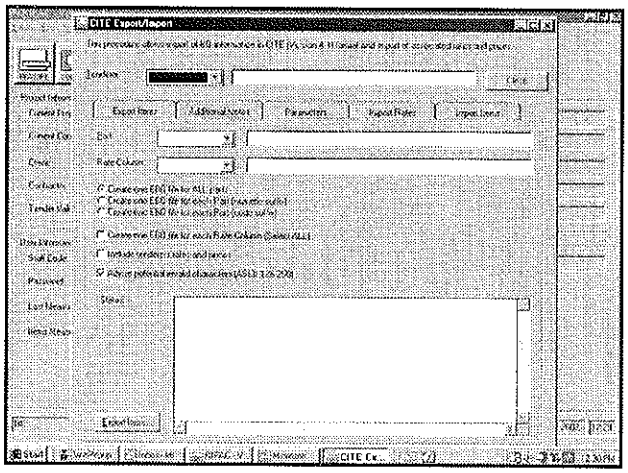
19

Considerations

- CITE Compliant
  - Programmed to a certain algorithm for e-tendering.
  - Use coding and numbering to ascertain formats (9 for pricing, 1-8 for layout etc)

20





Considerations

- Rephrasing of current libraries
  - Redrafting and Coding
  - Following CEMS rules e.g. concrete slab from m2 to m3.

23

Considerations

- Reformatting and alignment of presented format (due to CITE constraints)
- Possible need for more "rogue" items to incorporate NPQS numbers
- Checking and proof-reading.

24

CEMS Layout

CEMS Framework

0700000 Brickwork and Blockwork

MEASUREMENT ITEMS	MEASUREMENT RULES (IFC)	DEFINITION RULES	COVERAGE RULES	SUPPLEMENTARY INFORMATION
Information is shown in location under Preliminaries/ General Conditions	Note: Refer to General Notes for full IFC resource layers to be included in models			

MEASUREMENT ITEMS			
Classification			
Phrase	Phrase	Phrase	U
• Walls • Isolated piers • Isolated casings • Chimney stacks	• Walls, thickness stated • Facework one side, thickness stated • Facework bothsides, thickness stated	• Vertical • Battering • Tapering, one side • Tapering, both sides	m2

25

CEMS Layout

CEMS Framework

0700000 Brickwork and Blockwork

MEASUREMENT ITEMS	MEASUREMENT RULES (IFC)	DEFINITION RULES	COVERAGE RULES	SUPPLEMENTARY INFORMATION
Information is shown in location under Preliminaries/ General Conditions	Note: Refer to General Notes for full IFC resource layers to be included in models			

MEASUREMENT RULES	
"Description for unit measured stating when work shall be measured and the method by which the quantities are computed"	IFC Measurement Rules : attributes to be included in the measured item ie. the lowest level of IFC classification layers .
Example: (M1) Brickwork and blockwork unless otherwise stated are measured on the centre line of the material (M2) Curved work is so described with the radii stated	Example: "material" 042101 Brick 042102 Building Brick 042105 Facing Brick

26

CEMS Layout

CEMS Framework

0700000 Brickwork and Blockwork

MEASUREMENT ITEMS	MEASUREMENT RULES (IFC)	DEFINITION RULES	COVERAGE RULES	SUPPLEMENTARY INFORMATION
Information is shown in location under Preliminaries/ General Conditions	Note: Refer to General Notes for full IFC resource layers to be included in models			

"Definition Rules: defines the extent and limits of the work represented by a word or expression used in the rules and in a BQ prepared in accordance with the rules"
Example: (D1) Thickness stated is nominal thickness unless defined otherwise below (D2) Facework is any work in bricks or blocks finished fair

27

CEMS Layout

CEMS Framework

0700000 Brickwork and Blockwork

MEASUREMENT ITEMS	MEASUREMENT RULES (IFC)	DEFINITION RULES	COVERAGE RULES	SUPPLEMENTARY INFORMATION
Information is shown in location under Preliminaries/ General Conditions	Note: Refer to General Rules for full IFC resource layers to be included in models			

"Coverage Rules : Highlights particular incidental work which shall be deemed included in the appropriate items in a BQ to the extent that such work is included in the tender documents."

Example:

(C1)Brickwork and blockwork are deemed to include

(a) Extra materials for curved work

(b) All rough and fair cutting

28

CEMS Layout

CEMS Framework

0700000 Brickwork and Blockwork

MEASUREMENT ITEMS	MEASUREMENT RULES (IFC)	DEFINITION RULES	COVERAGE RULES	SUPPLEMENTARY INFORMATION
Information is shown in location under Preliminaries/ General Conditions	Note: Refer to General Rules for full IFC resource layers to be included in models			

"Supplementary Information : Rules governing the information which shall be given in addition to the information given."

Example:

Links to NPQS coding for items that are measured

Eg. quality and testing involved

What is NPQS? An Example

29

```
################################################################################
################################################################################

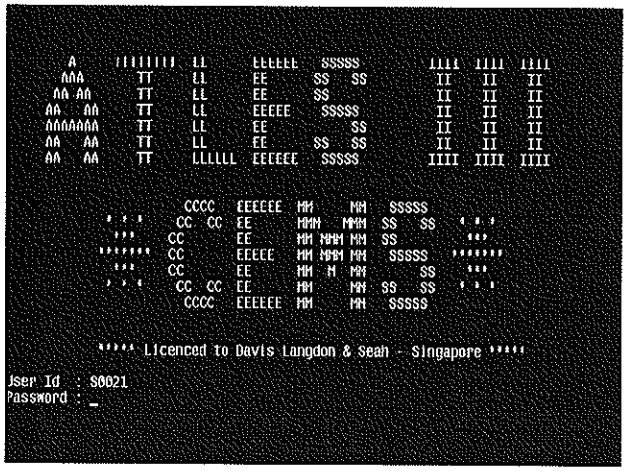
                PLEASE REMEMBER TO LOGOFF DURING LUNCH TIME

                              THANK  YOU

################################################################################
################################################################################

/dev/ttyp10: Connected to Virtual Machine 'pick0:SCO'


16:55:20  28 Mar 2002
AP - Enter a Job Ending with 2, 4, 6, 8, or 0 : CEMS
```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CC CC EE MMM MMM SS SS
CC EE MM MMM MM SS
CC EEEEE MM M MM SSSSS
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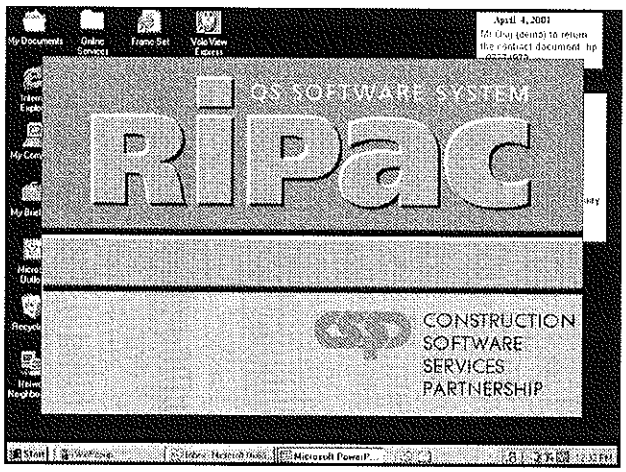
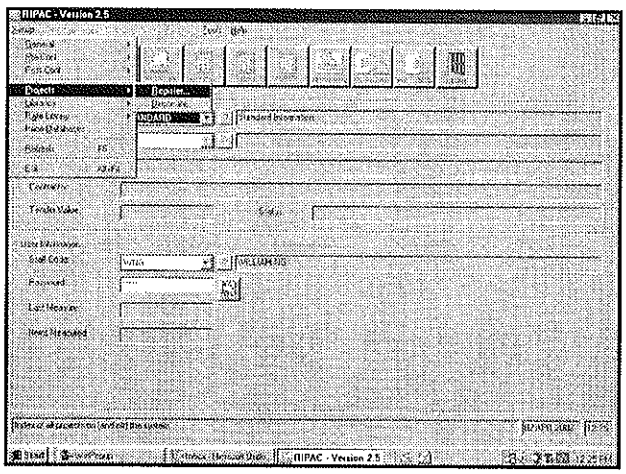
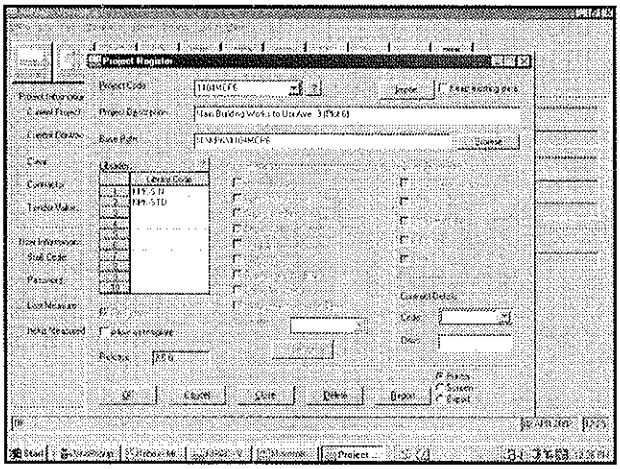
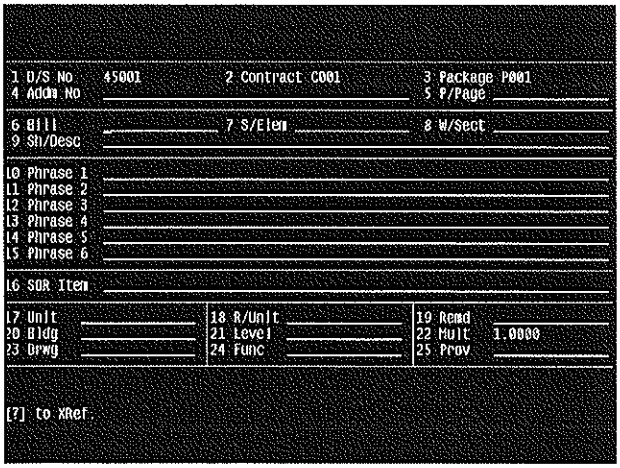
CC CC EE MM MM SS SS
CCCC EEEEEE MM MM SSSSS
***** Licenced to Davis Langdon & Seah - Singapore *****
User Id : S0021
Password : _


QS SOFTWARE SYSTEM
RIPaC
CONSTRUCTION
SOFTWARE
SERVICES
PARTNERSHIP


RIPAC - Version 2.5

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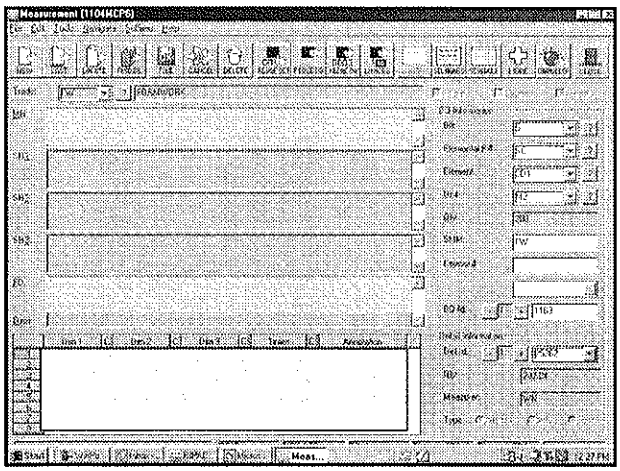
2 Contract C001
3 Package P001
4 Addn No
5 P/Page
6 Bill
7 S/Elem
8 W/Sect
9 Sh/Desc
10 Phrase 1
11 Phrase 2
12 Phrase 3
13 Phrase 4
14 Phrase 5
15 Phrase 6
16 SOR Item
17 Unit
18 R/Unit
19 Remd
20 Bldg
21 Level
22 Mult 1.0000
23 Drwg
24 Func
25 Prov
[?] to XRef



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1 Group Work Sect Code  ?
                    Group Work Section Xreference
No.. Group Work Section Desc Code.....

1    PRELIMINARIES                  10
2    GENERAL NOTES                  15
3    PRIME COST AND                 20
     PROVISIONAL SUMS
4    PROVISIONAL SUMS               25
5    DEMOLITIONS AND                30
     ALTERATIONS
6    PILING                         40
7    EXCAVATION                     60
8    CONCRETE WORK                  80

Option (n,Dn,\EX): _
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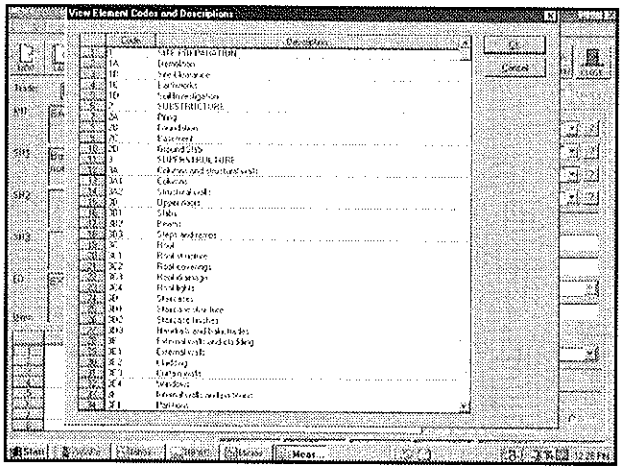


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1 D/S No    45001          2 Contract C001          3 Package P001
4 Addn No                                          5 P/Page

6 Bill      3 BUILDING WOR~ 7 S/Elem 30020 UF Upper~  8 W/Sect 80 CONCRETE WO~
9 Sh/Desc   CONCRETE WORKS TO 2ND FLOOR SLAB

10 Phrase 1
11 Phrase 2
12 Phrase 3
13 Phrase 4
14 Phrase 5
15 Phrase 6

16 SOR Item

17 Unit          18 R/Unit          19 Read
20 Bldg          21 Level           22 Mult   1.0000
23 Drwg          24 Func            25 Prov

['XRef] to copy item desc from prev DS eg. 'EXCA,'CONC.
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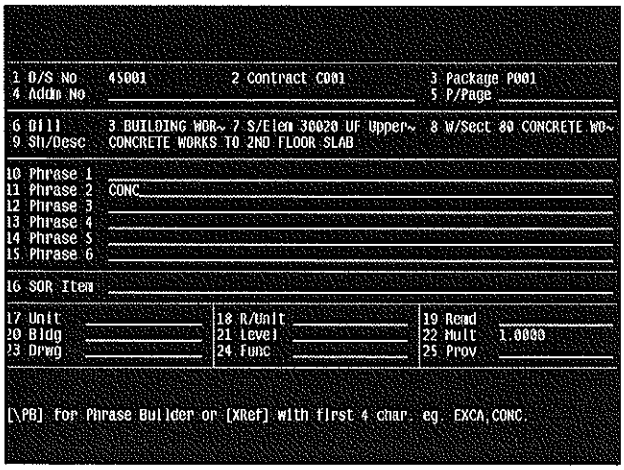
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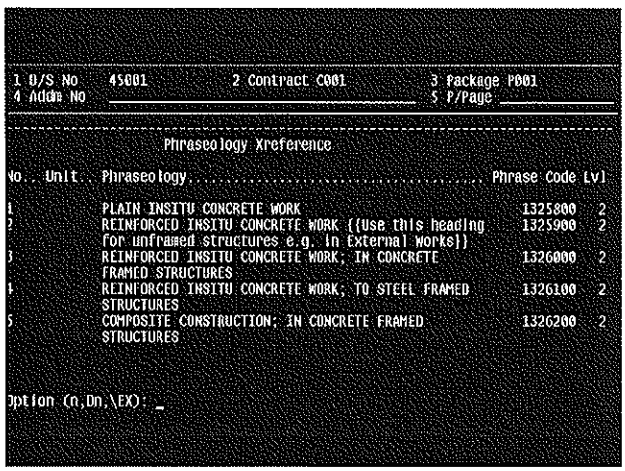
6 Bill 3 BUILDING WOR~ 7 S/Elem 30020 UF Upper~ 8 W/Sect 80 CONCRETE WO~
9 Sh/Desc CONCRETE WORKS TO 2ND FLOOR SLAB
10 Phrase 1
11 Phrase 2 CONC
12 Phrase 3
13 Phrase 4
14 Phrase 5
15 Phrase 6
16 SOR Item
17 Unit 18 R/Unit 19 Read
20 Bldg 21 Level 22 Mult 1.0000
23 Drwg 24 Func 25 Prov
[\PB] for Phrase Builder or [XRef] with first 4 char. eg. EXCA,CONC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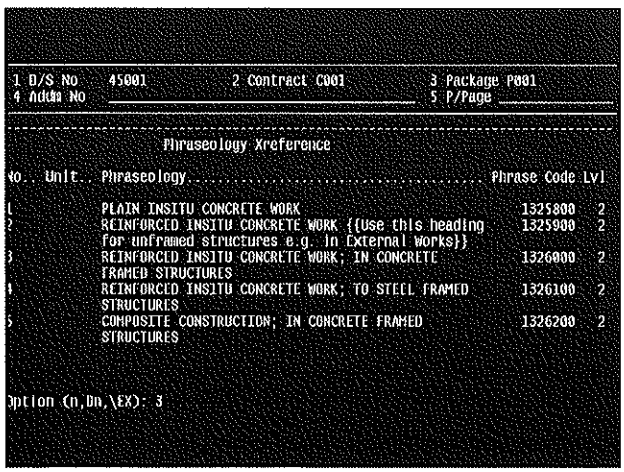
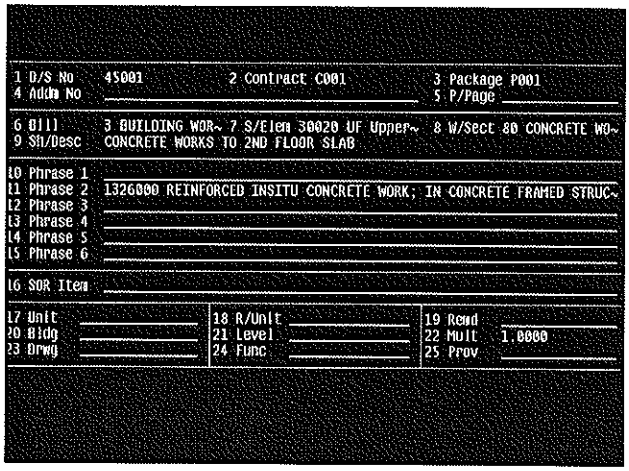
4 Addm No 5 P/Page
Phraseology Xreference
No. Unit. Phraseology Phrase Code Lvl
1 PLAIN INSITU CONCRETE WORK 1325800 2
2 REINFORCED INSITU CONCRETE WORK {{Use this heading for unframed structures e.g. in External Works}} 1325900 2
3 REINFORCED INSITU CONCRETE WORK; IN CONCRETE FRAMED STRUCTURES 1326000 2
4 REINFORCED INSITU CONCRETE WORK; TO STEEL FRAMED STRUCTURES 1326100 2
5 COMPOSITE CONSTRUCTION; IN CONCRETE FRAMED STRUCTURES 1326200 2
Option (n,Dn,\EX):


1 D/S No 45001 2 Contract C001 3 Package P001
4 Addm No 5 P/Page
Phraseology Xreference
No. Unit. Phraseology Phrase Code Lvl
1 PLAIN INSITU CONCRETE WORK 1325800 2
2 REINFORCED INSITU CONCRETE WORK {{Use this heading for unframed structures e.g. in External Works}} 1325900 2
3 REINFORCED INSITU CONCRETE WORK; IN CONCRETE FRAMED STRUCTURES 1326000 2
4 REINFORCED INSITU CONCRETE WORK; TO STEEL FRAMED STRUCTURES 1326100 2
5 COMPOSITE CONSTRUCTION; IN CONCRETE FRAMED STRUCTURES 1326200 2
Option (n,Dn,\EX): 3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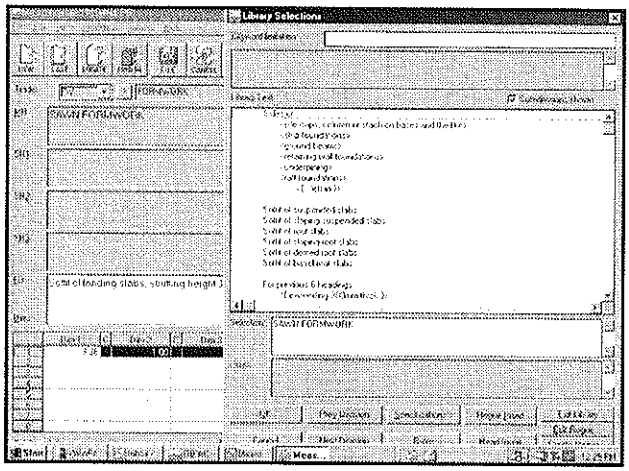
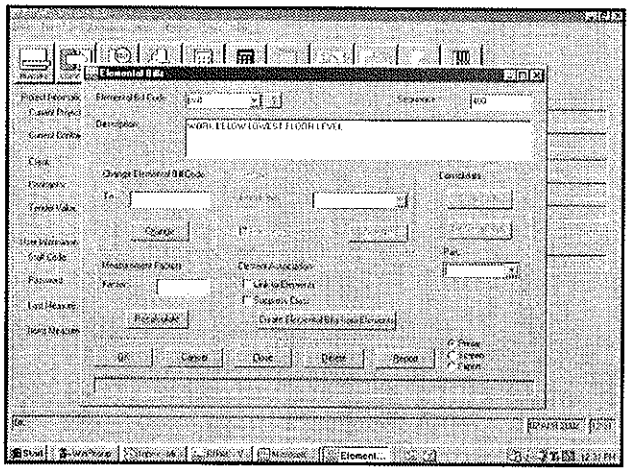
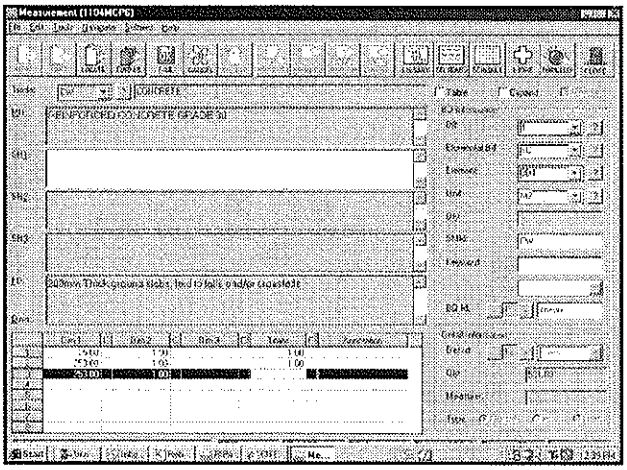
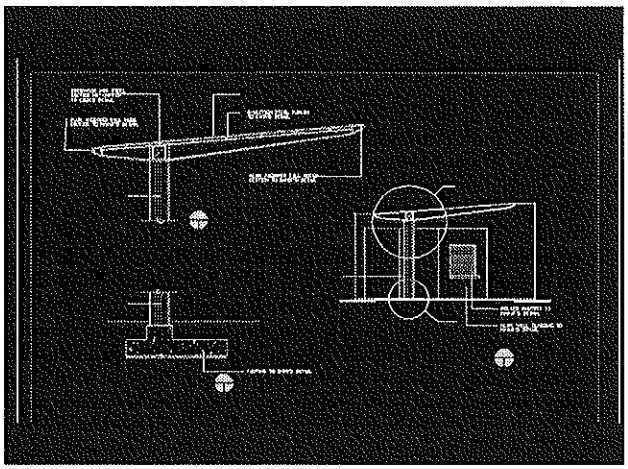
4 Addn No 5 P/Page
6 Bill 3 BUILDING WOR~ 7 S/Elem 30020 UF Upper~ 8 W/Sect 80 CONCRETE WO~
9 Sh/Desc CONCRETE WORKS TO 2ND FLOOR SLAB
10 Phrase 1
11 Phrase 2 1326000 REINFORCED INSITU CONCRETE WORK; IN CONCRETE FRAMED STRUC~
12 Phrase 3
13 Phrase 4
14 Phrase 5
15 Phrase 6
16 SOR Item
17 Unit 18 R/Unit 19 Rend
20 Bldg 21 Level 22 Mult 1.0000
23 Drwg 24 Func 25 Prov





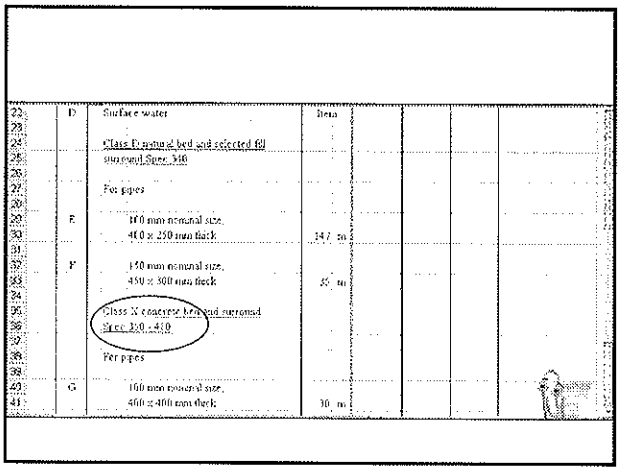




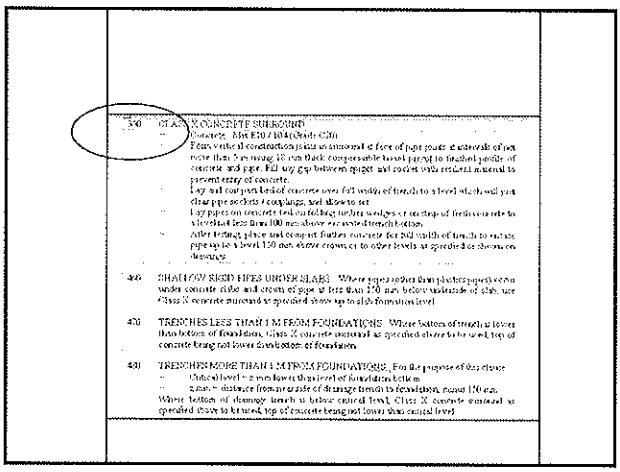
A GIST

- Specification Online
- Based on Productivity Standards, Quality, Workmanship and Performance
- Links to other web based information
- Provides diagrams with explanation notes.
- Link to NPQS is by the Supplementary Information Column
- Less editing of specifications

48

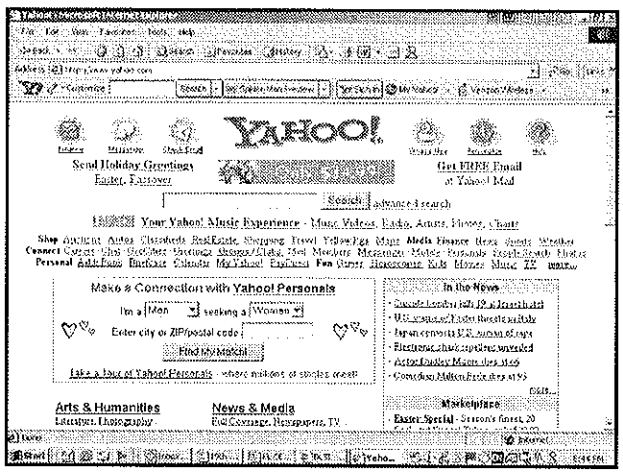


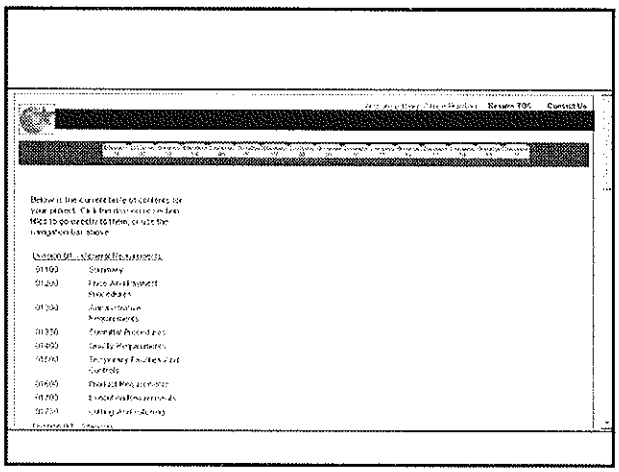
22	D	Surface water	Item					
23								
24		Class D cushion of bed and selected fill						
25		surround Spec 340						
26								
27		For pipes						
28								
29	E	160 mm nominal size,						
30		460 x 250 mm thick	14.7 m					
31								
32	F	150 mm nominal size,						
33		450 x 300 mm thick	55 m					
34								
35		Class X concrete bed and surround						
36		Spec 330 - 410						
37								
38		For pipes						
39								
40	G	160 mm nominal size,						
41		460 x 400 mm thick	30 m					

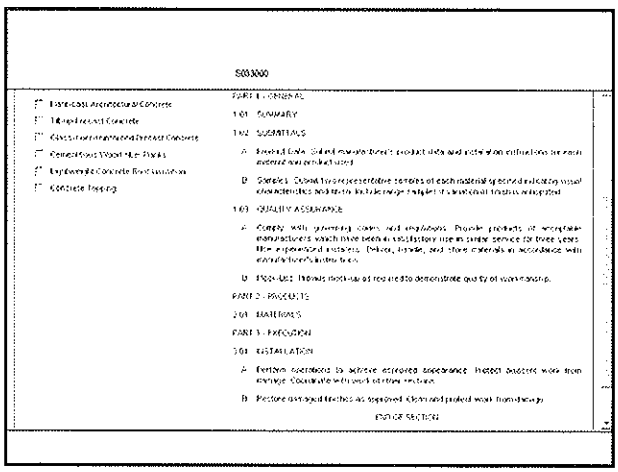


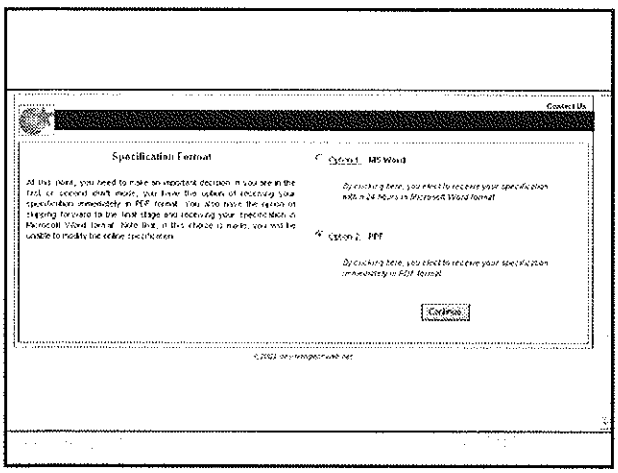
340 CLASS X CONCRETE SURROUND
Concrete Mix ED / 10 N/mm² Grade C20
Form vertical construction joints as continued at face of pipe socket at intervals of not more than 5 m using 10 mm thick compressible board parcel to finished profile of concrete and pipe. Fill any gap between spigot and socket with resilient material to prevent entry of concrete.
Lay soil compacted bed of concrete over full width of trench to a level which will give clear pipe sockets / couplings, and allow to set.
Lay pipes on concrete bed on folding mortar wedges or on top of brick or concrete to a level at least 3 mm above required invert level.
After testing, place and compact further concrete for full width of trench to encase pipe up to a level 150 mm above crown or to other levels as specified or shown on drawings.

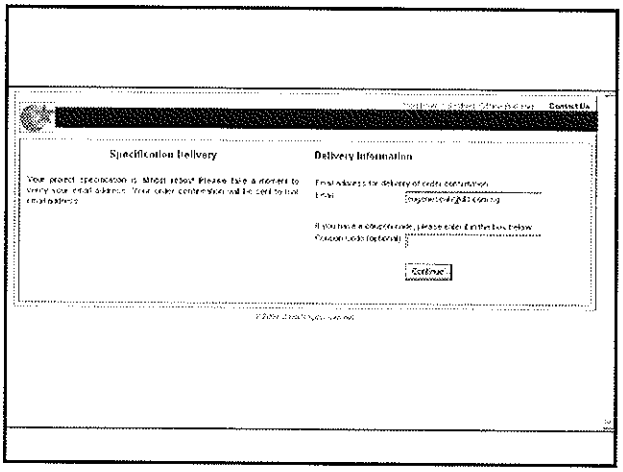
- 360 SHALLOW SIDED PIPES UNDER SLABS Where pipes rather than absolute speed is of no value concrete sides and crown of pipe at less than 150 mm below underside of slab, use Class X concrete surround as specified above up to slab formation level
- 370 TRENCHES LESS THAN 1 M FROM FOUNDATIONS Where bottom of trench is lower than bottom of foundations, Class X concrete surround as specified above to be used, top of concrete being not lower than bottom of foundation
- 380 TRENCHES MORE THAN 1 M FROM FOUNDATIONS For the purpose of this clause
  - Old level = a imaginary line from the level of foundation bottom
  - 2 mm = distance from inner side of drainage trench to foundation, normal 150 mm.
  Where bottom of drainage trench is below control level, Class X concrete surround as specified above to be used, top of concrete being not lower than control level

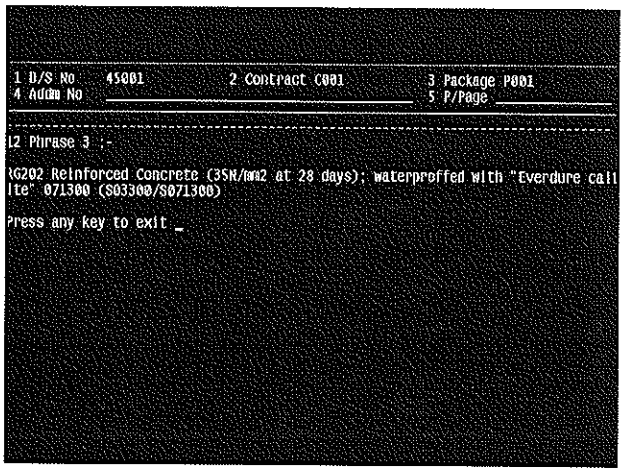


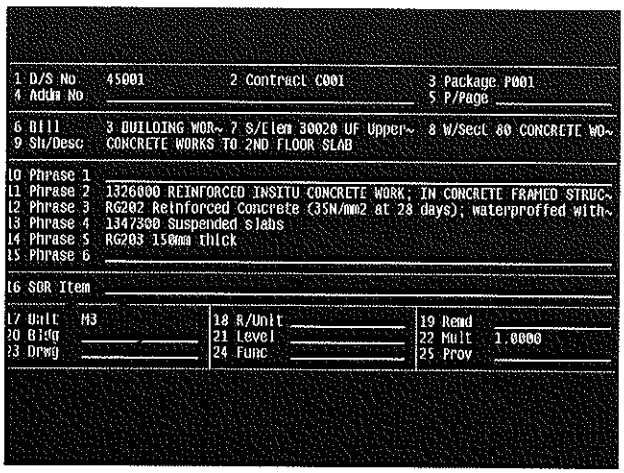


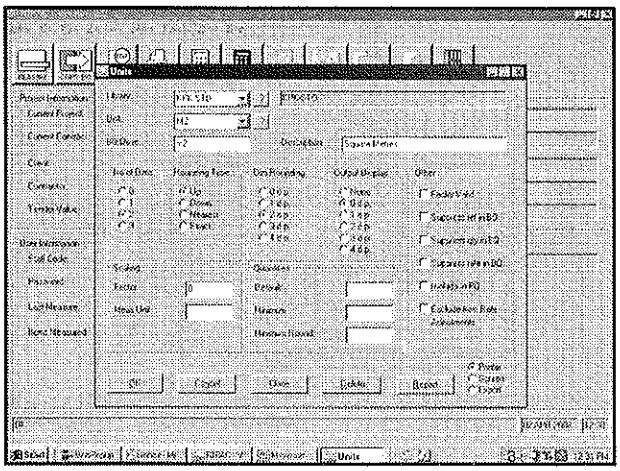

SECTION 033000
PART 1 - GENERAL
1.01 SUMMARY
1.02 SUBMITTALS
1.03 QUALITY ASSURANCE
PART 2 - PRODUCTS
2.01 MATERIALS
PART 3 - EXECUTION
3.01 INSTALLATION
END OF SECTION


Specification Format
Option 1: MS Word
Option 2: PDF
Continue


Specification Delivery
Delivery Information
Continue


1 D/S No 45001
2 Contract C001
3 Package P001
4 Addn No
5 P/Page
12 Phrase 3 :-
RG202 Reinforced Concrete (35N/mm2 at 28 days); waterproffed With "Everdure cai
ite" 071300 (S03300/S071300)
Press any key to exit _


1 D/S No 45001
2 Contract C001
3 Package P001
4 Addn No
5 P/Page
6 Bill 3 BUILDING WOR~ 7 S/Elem 30020 UF Upper~ 8 W/SecC 80 CONCRETE WO~
9 Sh/Desc CONCRETE WORKS TO 2ND FLOOR SLAB
10 Phrase 1
11 Phrase 2 1326000 REINFORCED INSITU CONCRETE WORK, IN CONCRETE FRAMED STRUC~
12 Phrase 3 RG202 Reinforced Concrete (35N/mm2 at 28 days); waterproffed With~
13 Phrase 4 1347300 Suspended slabs
14 Phrase 5 RG203 150mm thick
15 Phrase 6
16 SOR Item
17 Unit M3
18 A/Unit
19 Rend
20 Bldg
21 Level
22 Mult 1.0000
23 Drwg
24 Func
25 Prov



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 1 D/S No    45001          2 Contract C001          3 Package P001
 4 Addn No                                           5 P/Page

 6 Bill      3 BUILDING WOR~ 7 S/Elem 30020 UF Upper~  8 W/Sect 80 CONCRETE WO~
 9 Sh/Desc   CONCRETE WORKS TO 2ND FLOOR SLAB

26 Unit    M3              27 R/Unit                   28 Remd
29 Bldg                    30 Level                    31 Mult  1.0000

32 No | 33 Length | 34 Width | 35 Depth | 36 T/S | 37 L/Qty | 38 Annot | 39 QY | 40 X | 41 Loc
 1>   |    10.000 |    1.000 |    1.000 |  1.000 |    10.00 |          |       |      |
 2
 3
 4
 5
 6
 7

                        42 Total Line Qty
38.1 Annotation <CONCRETE IN SLAB_
```

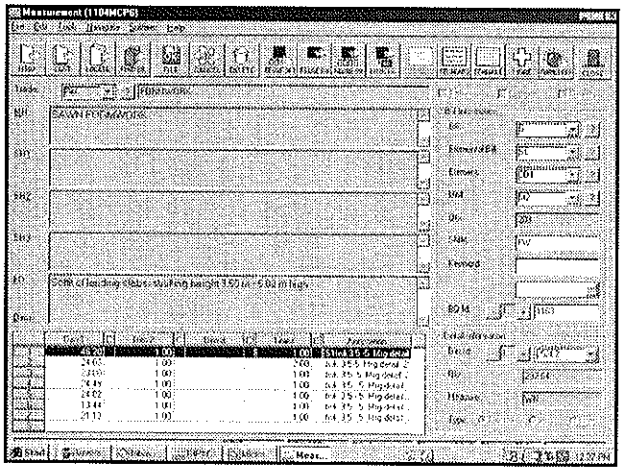
```
 1 D/S No    45001          2 Contract C001          3 Package P001
 4 Addn No                                           5 P/Page

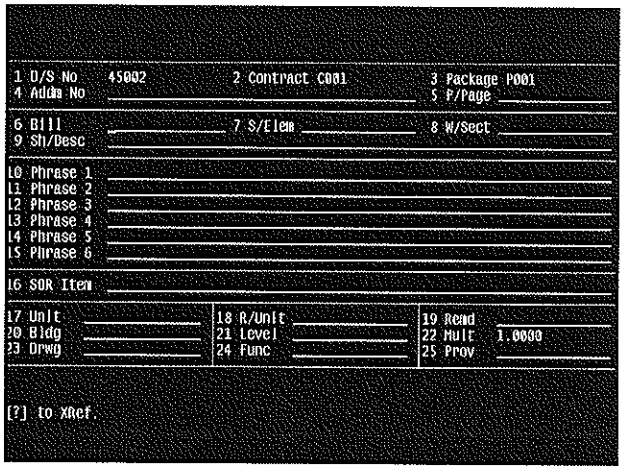
 6 Bill      3 BUILDING WOR~ 7 S/Elem 30020 UF Upper~  8 W/Sect 80 CONCRETE WO~
 9 Sh/Desc   CONCRETE WORKS TO 2ND FLOOR SLAB

10 Phrase 1
11 Phrase 2  1326000 REINFORCED INSITU CONCRETE WORK; IN CONCRETE FRAMED STRUC~
12 Phrase 3  RG202 Reinforced Concrete (35N/mm2 at 28 days); waterproffed with~
13 Phrase 4  1347300 Suspended slabs
14 Phrase 5  RG205 150mm thick
15 Phrase 6

16 SOR Item

17 Unit    M3              18 R/Unit                   19 Remd
20 Bldg                    21 Level                    22 Mult  1.0000
23 Drwg                    24 Func                     25 Prov
```

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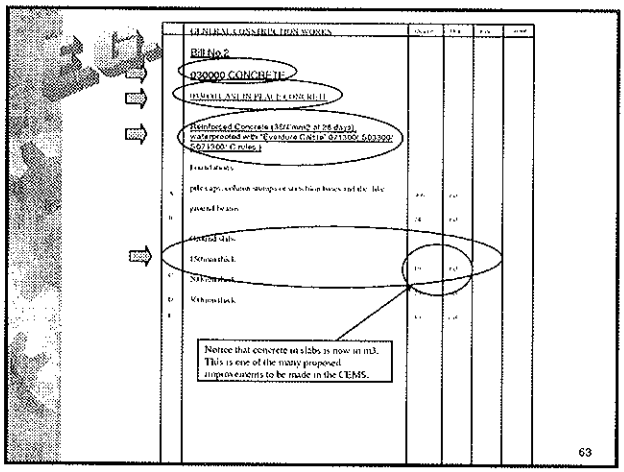
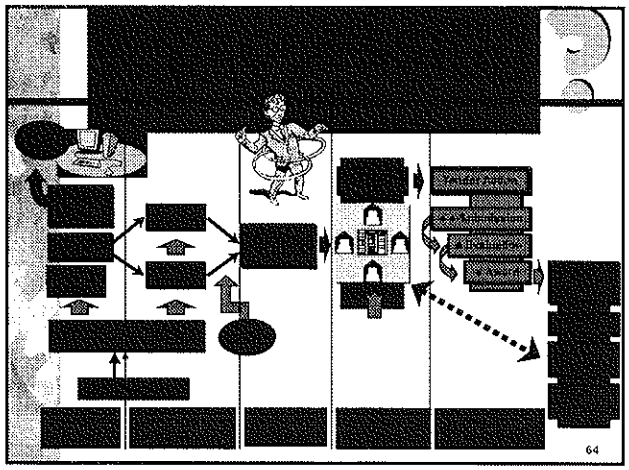
2 Contract C001
3 Package P001
4 Addn No
5 P/Page
6 Bill
7 S/Elem
8 W/Sect
9 Sh/Desc
10 Phrase 1
11 Phrase 2
12 Phrase 3
13 Phrase 4
14 Phrase 5
15 Phrase 6
16 SOR Item
17 Unit
18 R/Unit
19 Read
20 Bldg
21 Level
22 Mult 1.0000
23 Drwg
24 Func
25 Prov
[?] to XRef


Bill No.2
030000 CONCRETE
Notice that concrete in slabs is now in m3.
This is one of the many proposed
improvements to be made in the CEMS.
63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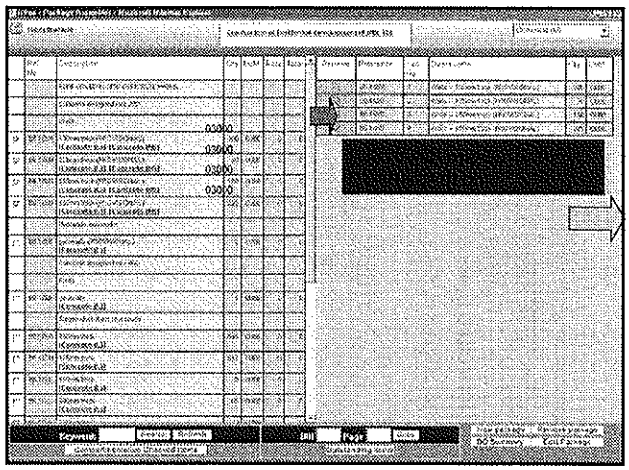
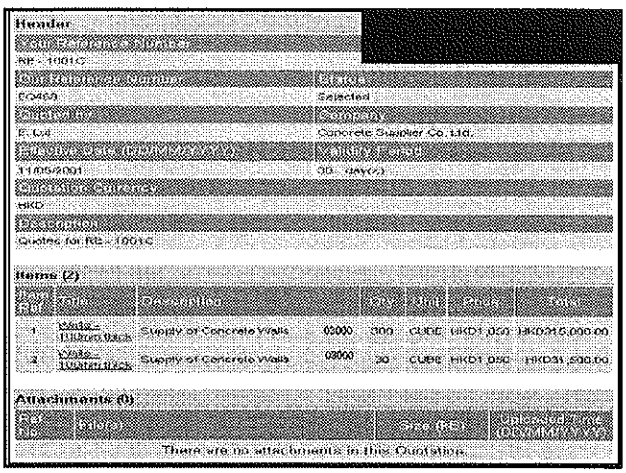
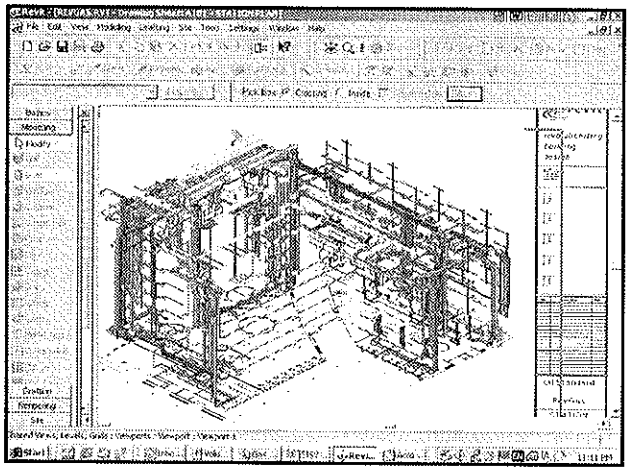
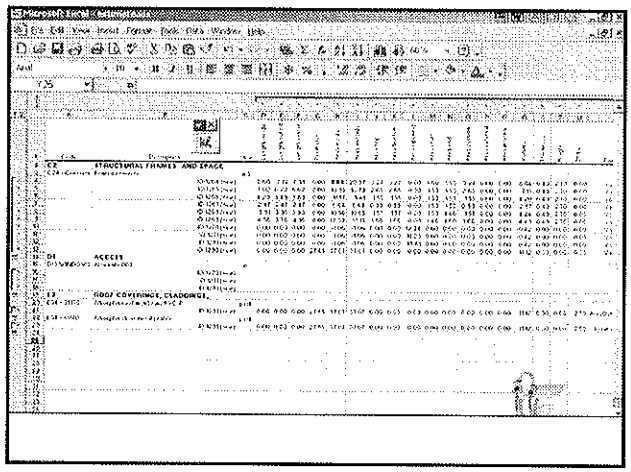
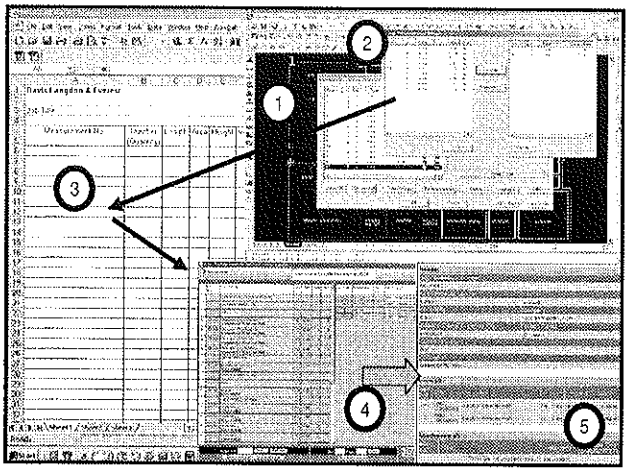


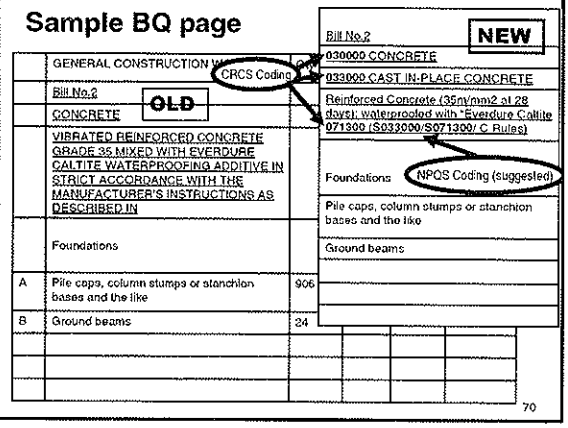

Header
Our Reference Number
RE - 1001C
Our Reference Number
Status
Selected
Company
Concrete Supplier Co. Ltd.
Validity Period
30 day(s)
Quotation Currency
HKD
Description
Quotes for RE - 1001C
Items (2)
Supply of Concrete Walls
03000
300
CUBE
HKD1,050
HKD315,000.00
Supply of Concrete Walls
03000
30
CUBE
HKD1,050
HKD31,500.00
Attachments (0)
There are no attachments in this Quotation.






1
2
3
4
5

Sample BQ page

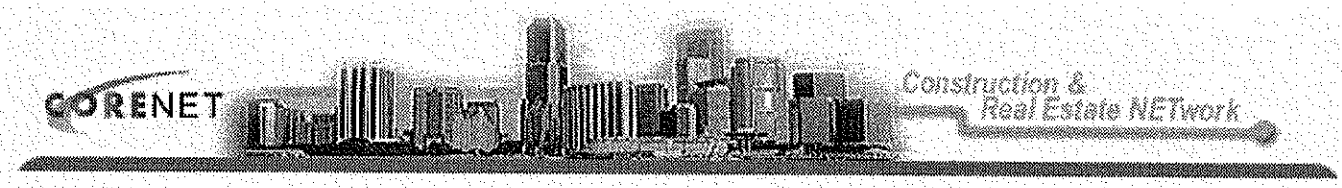


Effect of CEMS framework on QS

- Traditional measurement process is retained via Trades/Element
- Quantity Surveying practices need to reclassify phraseology libraries
- Final BQ format in CP80 for ease of cost planning and analysis.
- Easier measurement procedure for BQ production and interpretation of measurement standards

Effect of CEMS framework on Contractors

- Creation of upfront value adding services to complement core QS services through framework
  - Value Management and Engineering
  - Risk Management (Anticipation of Cost of Risk through models)
  - Integrated Management (PM, QS, QS (M&E))
- Moving into other industries
- Staying relevant!!!



IT Seminar 11
Re-inventing Construction with IT Standards and Digital Technologies

icFox Successes and Sharing of E-Tender Experience

Presented by

Mr Glenn Low
Manager, Business Services (E-Tender)
icFox Singapore Pte Ltd
Mr Kwa Chye Guan, Contracts Manager
Kajima Overseas Asia Pte Ltd

IT SEMINAR 11

Re-inventing Construction with IT Standards and Digital Technologies

PROGRAMME

8.30am	Registration
9.00am	Keynote Speech *Mr Seah Choo Meng, President, Quantity Surveying Council Singapore Institute of Surveyors and Valuers*
9.30am	Making SS CP83 compliance easy: An architect's experience *Mr Kevin Chua Chin Shun, Project Architect* *C&C Chartered Architects*
10.00am	Preparing You for Electronic Submissions *Ms Genevieve Tan, Technical Consultant* *Building and Construction Authority*
10.30am	Tea Break & Tour of Electronic Submission System Training Room
11.00am	Transforming the Standard Method of Measurement to a National Construction Electronic Measurement Standard *Mr Seah Kwee Yong, Chairman, Measure Work Group* *Construction IT Standards Technical Committee*
11.30am	Adapting Industry Work Processes during Tender Stage *Mr Ho Swee Sun, Associate Director* *KPK Quantity Surveyors (1995) Pte Ltd* *Mr Eugene Seah, Senior Quantity Surveyor* *Davis Langdon & Seah Singapore Pte Ltd*
12.00pm	icFox Successes and Sharing of E-Tender Experience *Mr Glenn Low, Manager, Business Services (E-Tender)* *icFox Singapore Pte Ltd* *Mr Kwa Chye Guan, Contract Manager* *Kajima Overseas Asia Pte Ltd*
12.30pm	Embarking on the 'E' journey with ICX123.com: A case study *Ms Ong Hwee Peng, Business Development Manager* *icx123 Pte Ltd*
1.00pm	End of Seminar Industry Briefing starts at 2.00pm

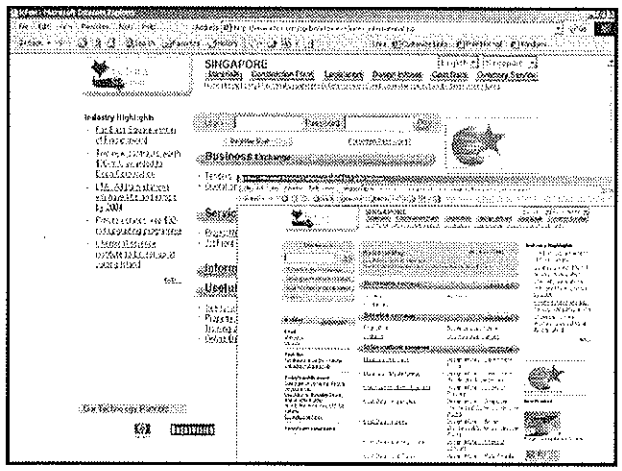
THE INTERNET HUB FOR THE
GLOBAL CONSTRUCTION INDUSTRY

International Construction Information
and e-Business Exchange

icFox Successes & Sharing of e-Tender Experience

AGENDA

- **Brief Intro to icFox**
- **icFox ProjectNet**
- **icFox E-Tender**



Technology Partners

ORACLE Sun hp invent

Citadon. Network Appliance VERITAS

BROADVISION Ariba.com

Successful e-Tenders Conducted

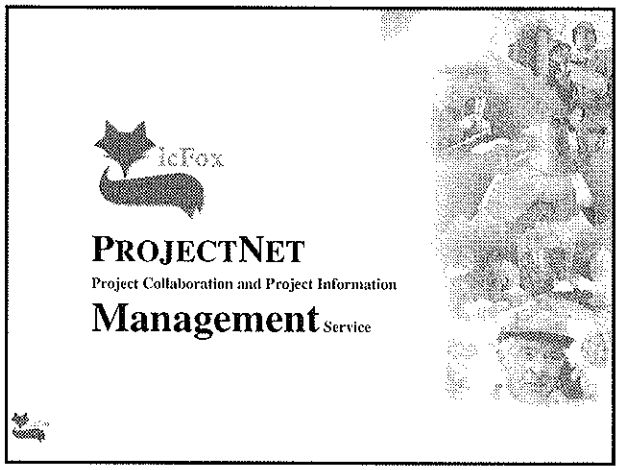
- Eureka's Lift Sub-Contract
- PREMAS Int'l Building Maintenance Contract
- Prima Factory Main Contract
- Guillemard Residential Main Contract

Projects Using ProjectNet

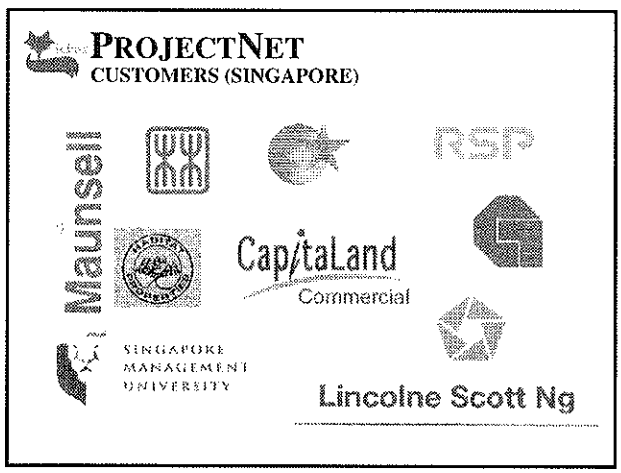
- 23 On-Going projects on ProjectNet

Higher profile projects include:

- SMU Campus
- Changi Airport Terminal 2 Upgrade
- Cisco Recall Centre II
- 7 CapitaLand Residential/Commercial projects
- PREMAS International, Project Portfolio Management

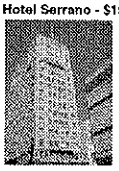

icFox
PROJECTNET
Project Collaboration and Project Information
Management Service


PROJECTNET
CUSTOMERS (INTERNATIONAL)
FLUOR
AMEC
BECHTEL
SKANSKA
SHIMIZU CORPORATION

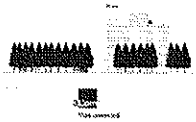

PROJECTNET
CUSTOMERS (SINGAPORE)
Maunsell
RSP
CapitaLand
Commercial
SINGAPORE
MANAGEMENT
UNIVERSITY
Lincolne Scott Ng

PROJECTNET
FRAMEWORK SCALABILITY

Hotel Serrano - $15m



3Com Corporate Campuses in CA & UK



The Venetian Hotel - $3b



Cana Brava - $600m in Brazil



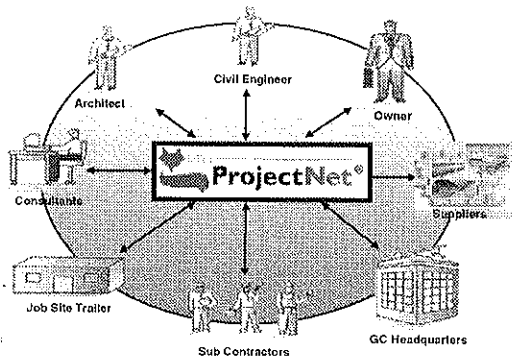
Webvan – 26 sites in US



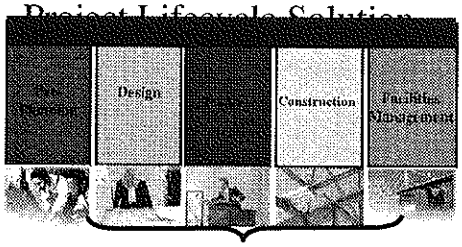
Expansion of largest Copper Mine in world

Phelps Dodge Mining Company

PROJECTNET
COMMON PLATFORM

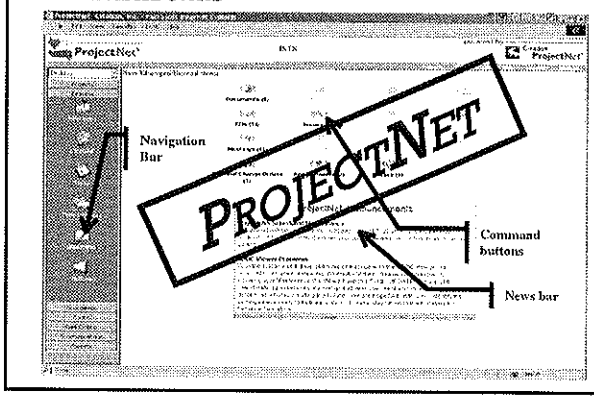


Project Lifecycle Solution

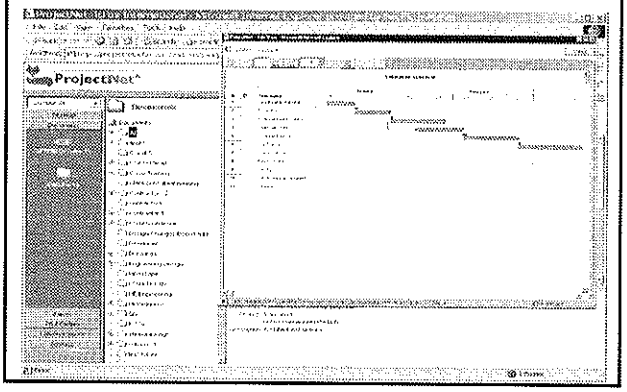


ProjectNet®

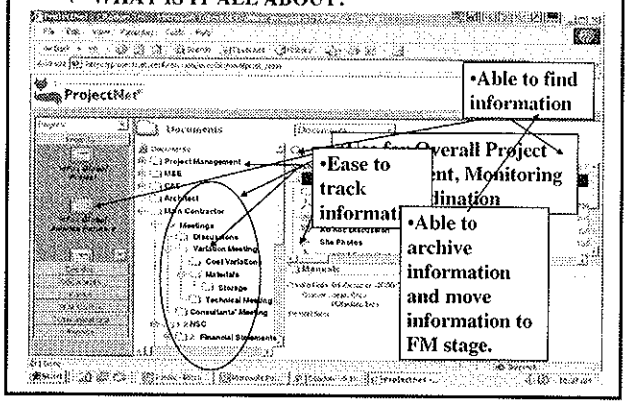
PROJECTNET
DASHBOARD



PROJECTNET
EASE OF COMMENTING...



PROJECTNET
WHAT IS IT ALL ABOUT?



PROJECTNET
HARDWARE REQUIRMENTS

System

- Pentium class PC, or computer supported by the browsers listed below
- 32MB RAM minimum, 64 MB RAM recommended
- Windows 95 or Windows NT 4.0 or higher

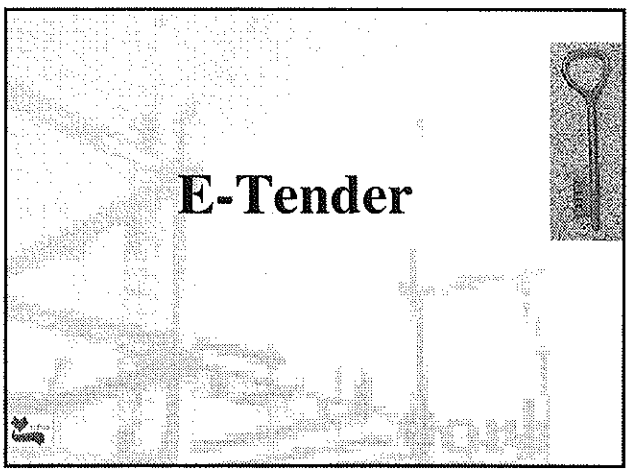
Browsers & settings

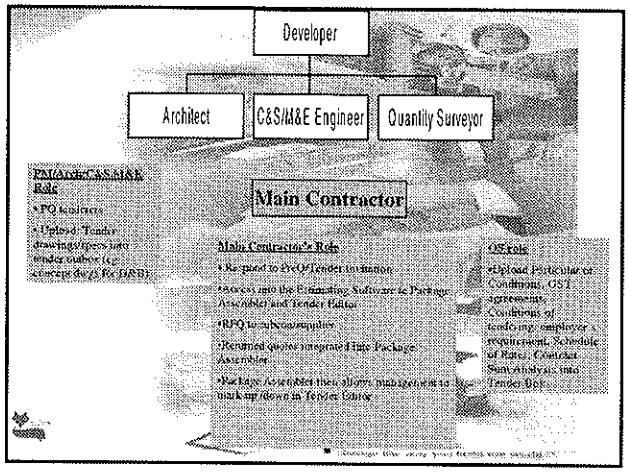
- Netscape Navigator/Communicator 4.0 or higher or Microsoft Internet Explorer 4.0 or higher

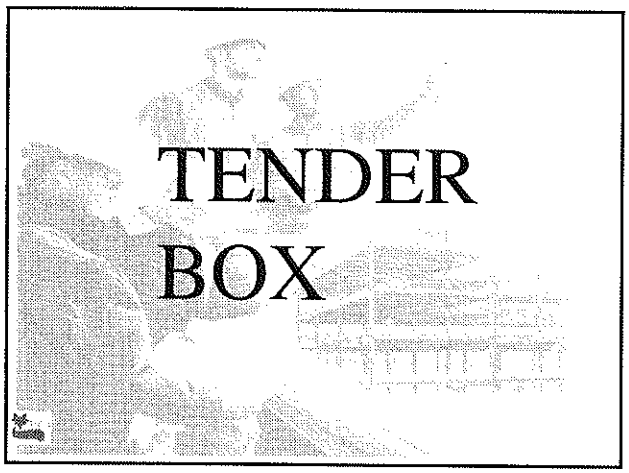
PROJECTNET
HARDWARE REQUIRMENTS

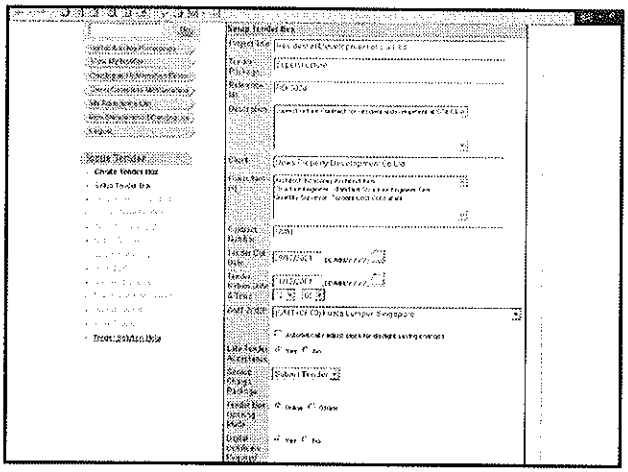
Communications

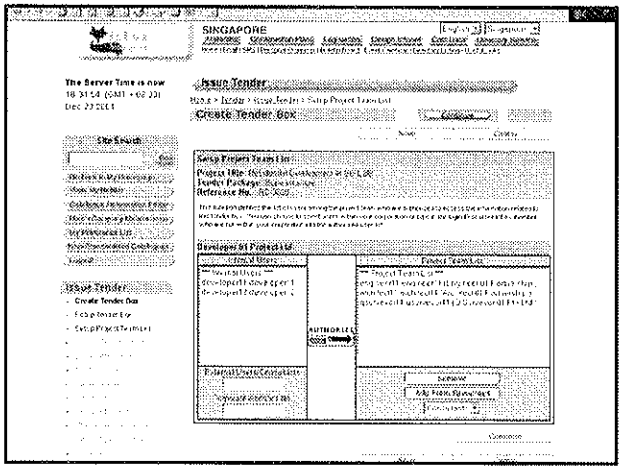
- A connection to the Internet is required with a connection speed of 56Kbps or higher
- For heavy data usage and content publishing, an ISDN, DSL or a T-1 connection is recommended

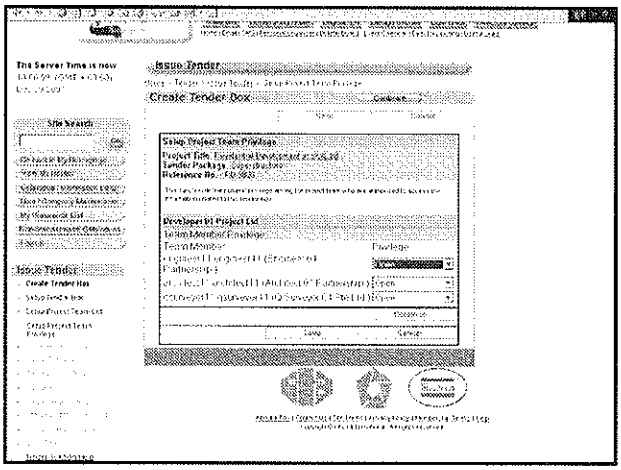


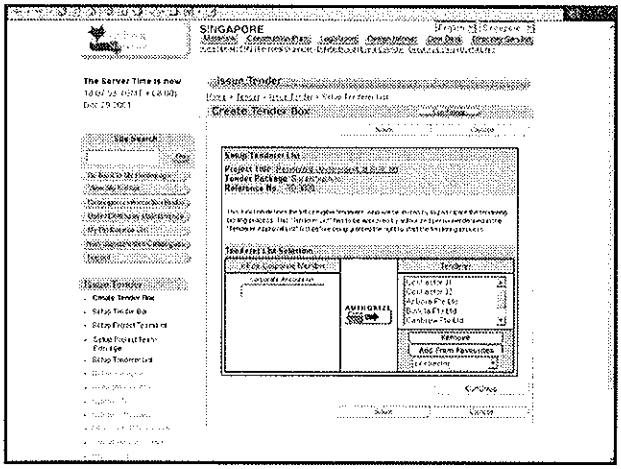

Developer
Architect
C&S/M&E Engineer
Quantity Surveyor
Main Contractor
Main Contractor's Role
QS role

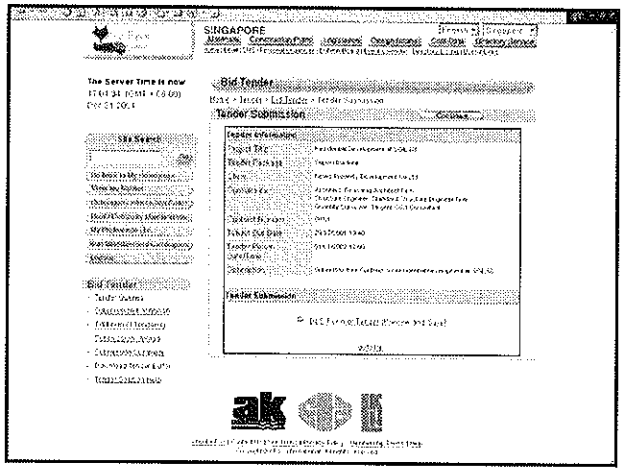

TENDER
BOX

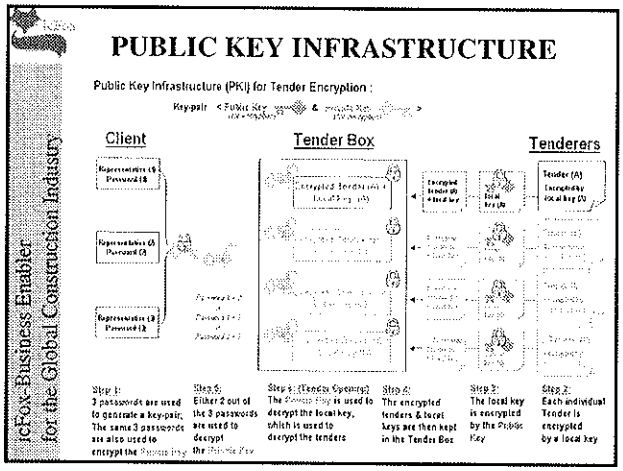


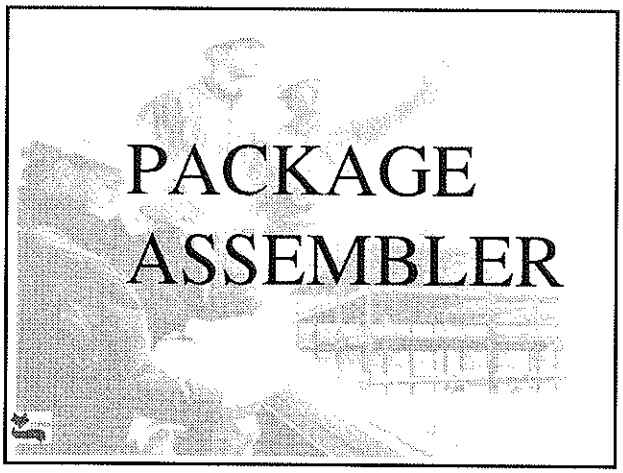

SINGAPORE
The Server Time is now
Issue Tender
Create Tender Box

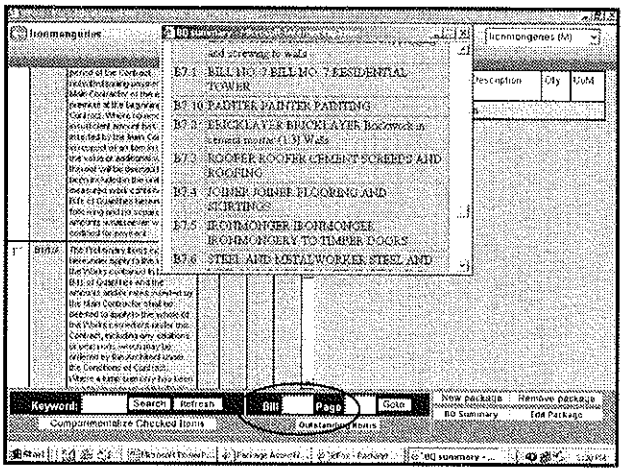

The Server Time is now
Issue Tender
Create Tender Box

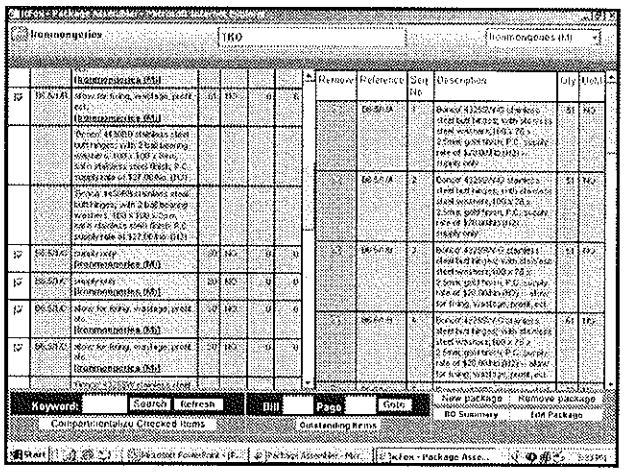

SINGAPORE
The Server Time is now
Issue Tender
Create Tender Box

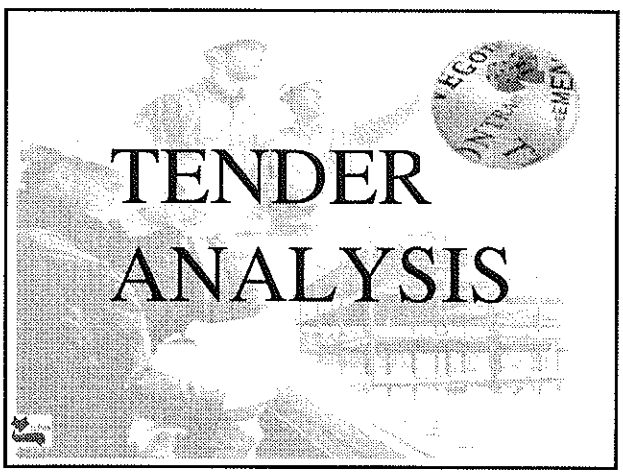

SINGAPORE
Bid Tender
Tender Submission

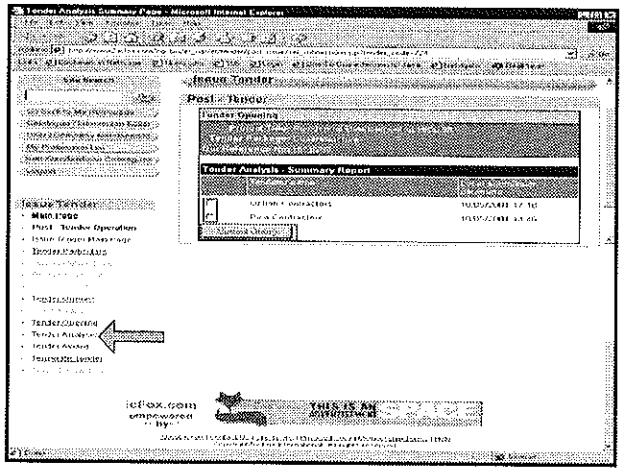

PUBLIC KEY INFRASTRUCTURE
Public Key Infrastructure (PKI) for Tender Encryption :
Client
Tender Box
Tenderers
Step 1:
3 passwords are used to generate a key-pair. The same 3 passwords are also used to encrypt the
Step 5:
Either 2 out of the 3 passwords are used to decrypt
Step 4: (Tenders Opening)
The
is used to decrypt the local key, which is used to decrypt the tenders
Step 4:
The encrypted tenders & local keys are then kept in the Tender Box
Step 3:
The local key is encrypted by the Public Key
Step 2:
Each individual Tender is encrypted by a local key
iEFox-Business Enabler for the Global Construction Industry

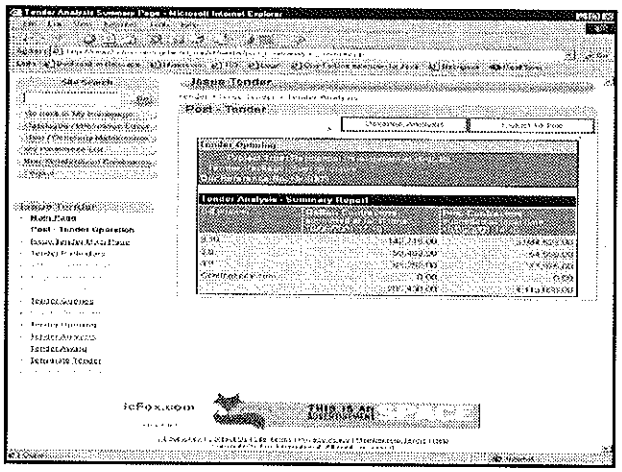

PACKAGE ASSEMBLER

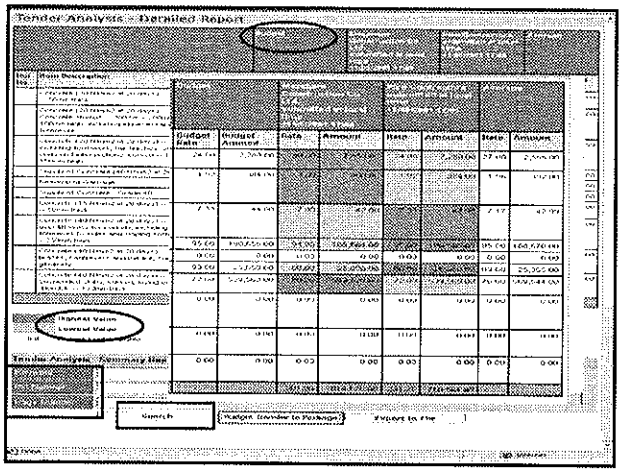

Ironmongeries
B7.1 BILL NO. 7 BILL NO. 7 RESIDENTIAL TOWER
B7.10 PAINTER PAINTER PAINTING
B7.2 BRICKLAYER BRICKLAYER BRICKWORK
B7.3 ROOFER ROOFER CEMENT SCREEDS AND ROOFING
B7.4 JOINER JOINER FLOORING AND SKIRTINGS
B7.5 IRONMONGER IRONMONGER IRONMONGERY TO TIMBER DOORS
B7.6 STEEL AND INSTALWORKER STEEL AND
Keyword
Search
Refresh
Bill
Page
Goto
Compare Priority Checked Items
Outstanding Items
New package
Remove package
BQ Summary
Edit Package

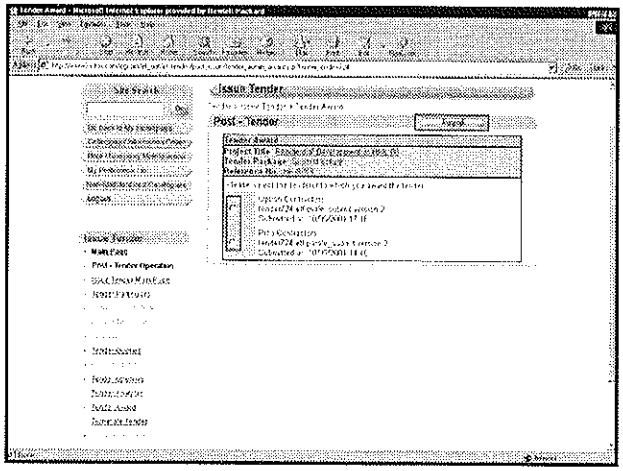

Ironmongeries
BQ
Remove
Reference
Item No
Description
Qty
Unit
Keyword
Search
Refresh
Bill
Page
Goto
Compare Priority Checked Items
Outstanding Items
New package
Remove package
BQ Summary
Edit Package


TENDER
ANALYSIS


Tender Analysis Summary Page - Microsoft Internet Explorer
Issue Tender
Post - Tender
Tender Opening
Tender Analysis - Summary Report
Main Page
Post - Tender Operation
Tender Opening
Tender Analysis
Tender Award
icFox.com
THIS IS AN


Tender Analysis Summary Page - Microsoft Internet Explorer
Issue Tender
Post - Tender
Tender Opening
Tender Analysis - Summary Report
Main Page
Post - Tender Operation
Tender Opening
Tender Analysis
Tender Award
Tender Analysis
icFox.com
THIS IS AN


Tender Analysis - Detailed Report
Budget Rate
Budget Amount
Rate
Amount
Rate
Amount
Rate
Amount
Highest Value
Lowest Value
Tender Analysis - Summary Rep
Search
Export to File



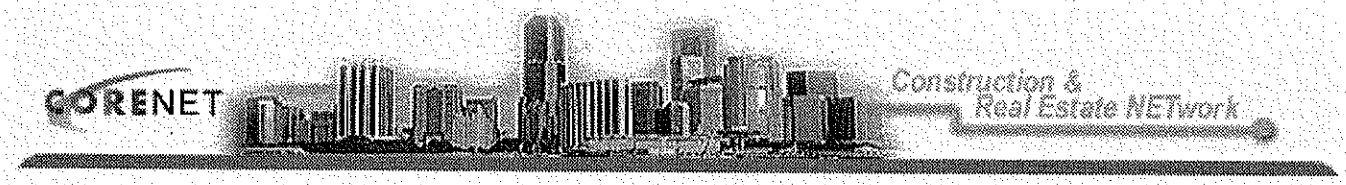
Feedback & Conclusion

- Ease of Multiple Project Control
- Infrastructure/Hardware Element
- Human Element
- Company Strategy – Areas to be Automated

- It Can Be Done!
  - Regardless of Company Size
  - Only Willingness to Adapt

QUESTIONS...

An icFox Presentation



IT Seminar 11
Re-inventing Construction with IT Standards and Digital Technologies

Embarking on the 'E' journey with ICX123.com: A case study

Presented by

Ms Ong Hwee Peng
Business Development Manager
icx123 Pte Ltd

icx123





Click. Connect. Collaborate.

EMBARKING ON THE 'E' JOURNEY WITH

icx123

the Information & Construction eXchange

By
Ong Hwee Peng, Business Development Manager

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Agenda

- Complexity in the Construction Value Chain
- Improving Business Efficiency
- ICX123's E-Journey Experience
- E-Journey Experience: Critical Success Factors
- Outlook on E-Commerce for Construction Industry

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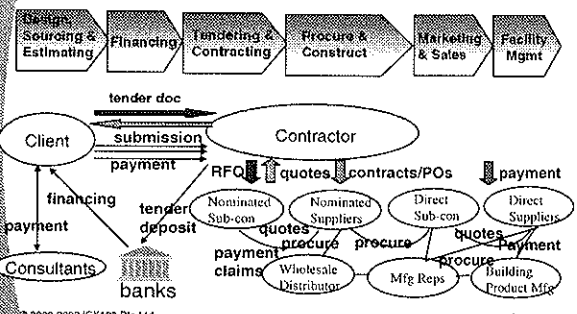
Complexity in the Construction Value Chain



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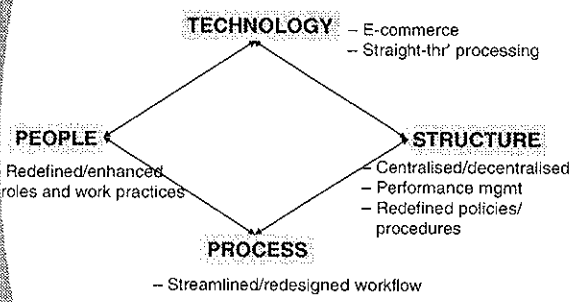
Improving Business Efficiency



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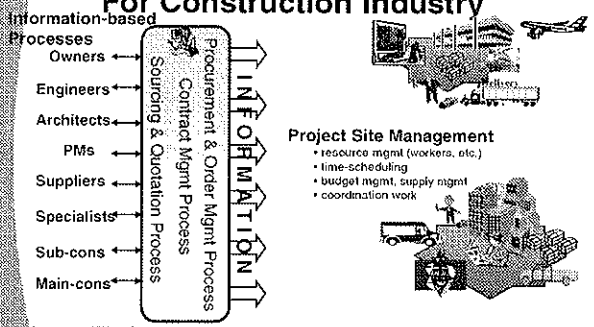
4

Identifying Business Processes For Construction Industry



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5

Initiatives For The Construction Industry

Construction 21

Released in October 1999, strategic blueprint in spelling out the vision and strategies to re-invent Singapore's construction industry

EPEC by SCAL/BCA

Launched in May 2000, to leverage on strategic information technology and to reengineer the procurement process for greater standardisation for the construction industry in Singapore

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6

ICX123's E-Journey Experience: E-Procurement

Dec' 2000



I am not ready yet



Have to manage different processes



Who to join?

April 2002



Hand-holding, educating

Software enhancement

HDBuilders.com

Inter-portal collaboration



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ICX123's E-Journey Experience: E-Tendering

- Successful online tendering exercise for JTC Biopolis Project in Dec 2001
- Over 1000 pages of documents and 1000+ drawings handled through ICX123 portal
- Participation level: 82%

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ICX123's E-Journey Experience: E-Tendering

- Response from tenderers is encouraging, what they find most useful:
  - having softcopy tender docs
  - having timely notification of tender documents including addenda
  - having softcopy of pricing document to work on
  - ordering online for printed copies
- Difference between domestic and foreign construction companies
- Overall, tenderers exhibit strong trust and confidence with icx123.com

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ICX123's E-Journey: Critical Success Factors

- Full endorsement & support from top and senior management for new initiatives
- Clear objective of implementing e-commerce initiatives
- Setting the right expectation and careful preparation
- Close work cooperation between organisation and ICX123 teams
- Constant feedback checks

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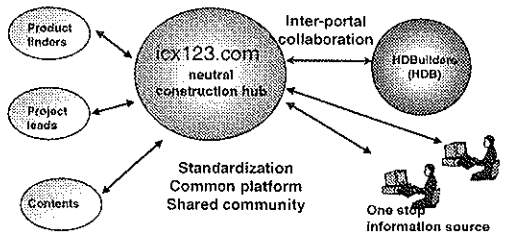
Outlook on E-Commerce for Construction Industry



Domestic & overseas portals

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CEMS

THE CONSTRUCTION ELECTRONIC MEASUREMENT STANDARDS (CEMS)

AN INTRODUCTION TO CEMS

CEMS Consultants
Davis Langdon & Seah
KPK Quantity Surveyors

CEMS

CEMS OBJECTIVES

- Facilitate development of automated measurement application/software
- Inter-relate with NPQS and CAD drawings and files
- Relational mapping to CRCS (Construction Resources Classification Standards)

CEMS

REQUIREMENT STUDY

- To study the advantages and disadvantages of SMM2 and obtain contractors' views on required improvements.
- To study and understand the design and drafting process of design consultants.
- To review software in the market capable of Automatic Quantity Take Off (AQTS) and explore the abilities and processes involved in using it.
- To identify the work process changes needed for the Quantity Surveying profession.
- To explore and understand the Information Technology (IT) needed for AQTS and ascertain the parameters and models that need to be considered.

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CEMS FRAMEWORK

PRINCIPLE CONSIDERATIONS

- Main users
- Purpose - Measurement/BQ production
- CRCS mapping
- CP80

CEMS

COMPARISON OF CP80 AND SMM2

CP80 Work Section Classification	SMM2
Preliminaries	(2) Preliminaries
Demolition and alteration works	(3) Demolitions and alterations
Piling and diaphragm walling	(4) Piling and diaphragm walling
Excavation works	(5) Excavation
Concrete work	(6) Concrete work
Brickwork and blockwork	(7) Brickworks and blockwork
Masonry	(9) Masonry
Roofing	(10) Roofing
Carpentry	(11) Carpentry and joinery
Joinery	
Ironmongery	(12) Ironmongery
Structural steelwork	(13) Structural steelwork
Metalwork	(14) Metalwork
Wall and ceiling finishes	(15) Wall and ceiling finishes
Floor finishing	(16) Floor finishings
Glazing	(20) Glazing
Painting and decorating	(21) Painting and decorating
Drainage	(22) Drainage work
Piped supply and disposal installation	(32) Plumbing
Ventilation, exhaust air conditioning installation	(38) Mechanical installations
Electrical supply/power and lighting installation	(39) Electrical installation
Other specialist works	(1) General principles (8) Asphalt work

CEMS

COMPARISON OF CP80 AND CRCS

CP80 Work Section Classification	CRCS
Preliminaries	01 General requirements
Demolition and alteration works	02 Site Construction
Piling and diaphragm walling	03 Concrete
Excavation works	04 Masonry
Concrete work	05 Metals
Brickwork and blockwork	06 Wood and Plastics
Masonry	07 Thermal and Moisture Protection
Roofing	08 Doors and Windows
Carpentry	09 Finishes
Joinery	10 Specialties
Ironmongery	11 Equipment
Structural steelwork	12 Furnishings
Metalwork	13 Special Construction
Wall and ceiling finishes	14 Conveying Systems
Floor finishing	15 Mechanical
Glazing	16 Electrical
Painting and decorating	
Drainage	
Piped supply and disposal installation	
Ventilation, exhaust air conditioning installation	
Electrical supply/power and lighting installation	
Other specialist works	

MAPPING CRCS TO CEMS

CEMS

CRCS - 040000 MASONRY

Number	Level 2 Title	Level 3 Title	Level 4 Title
040500	Basic Masonry Materials and Methods		
040600		Masonry Mortar	
040601			Cement and Lime Mortar
040700		Masonry Grout	
040701			Chemical-Resistant Grout
040800		Masonry Anchorage and Reinforcement	
040801			Continuous Joint Reinforcing
040900		Masonry Accessories	
040901			Control Joint Materials
042000	Masonry Units		
042100		Common Bricks; Facing Bricks	
042101			Brick

CEMS GROUPING

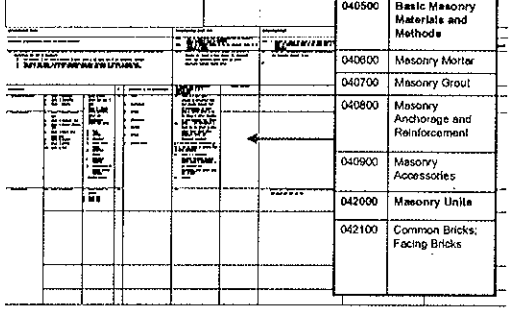
040000	MASONRY
040500	**Basic Masonry Materials and Methods**
040600	Masonry Mortar
040700	Masonry Grout
040800	Masonry Anchorage and Reinforcement
040900	Masonry Accessories
042000	**Masonry Units**
042100	Common Bricks; Facing Bricks

MAPPING CRCS TO CEMS

CEMS

07000000 MASONRY

- Rubble work



040000	MASONRY
040500	**Basic Masonry Materials and Methods**
040600	Masonry Mortar
040700	Masonry Grout
040800	Masonry Anchorage and Reinforcement
040900	Masonry Accessories
042000	**Masonry Units**
042100	Common Bricks; Facing Bricks

Sample BQ page

CEMS

	GENERAL CONSTRUCTION W	CRCS Coding			
	Bill No.2 **OLD**				
	CONCRETE				
	VIBRATED REINFORCED CONCRETE GRADE 35 MIXED WITH EVEROURE CALTITE WATERPROOFING ADDITIVE IN STRICT ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS AS DESCRIBED IN				
	Foundations				
A	Pile caps, column stumps or stanchion bases and the like	906			
B	Ground beams	24			

Bill No.2 **NEW**

030000 CONCRETE

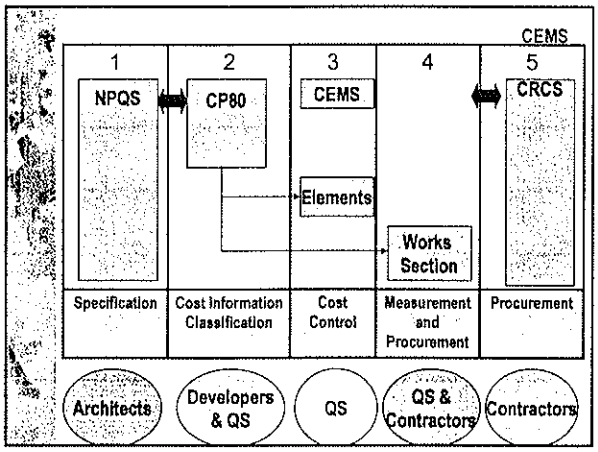
033000 CAST IN-PLACE CONCRETE

Reinforced Concrete (35n/mm2 at 28 days), waterproofed with "Everdure Calite 071300 (XXXXXX/YYYY/ C Rules)

Foundations — NPQS Coding

Pile caps, column stumps or stanchion bases and the like

Ground beams



CEMS

CEMS FORMAT - TABULATED LAYOUT

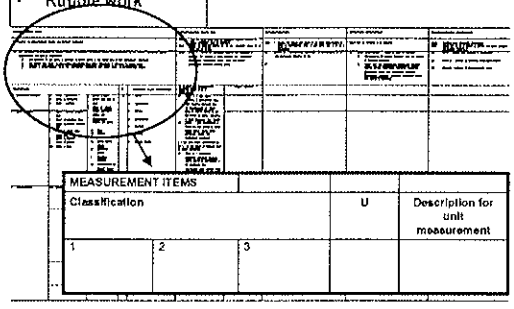
- Easy reference
- Simplified
- Improved measurement workflow
- Standard phraseology
- Standard interpretation of rules

CEMS

CEMS LAYOUT – MEASUREMENT ITEMS

07000000 MASONRY

- Rubble work

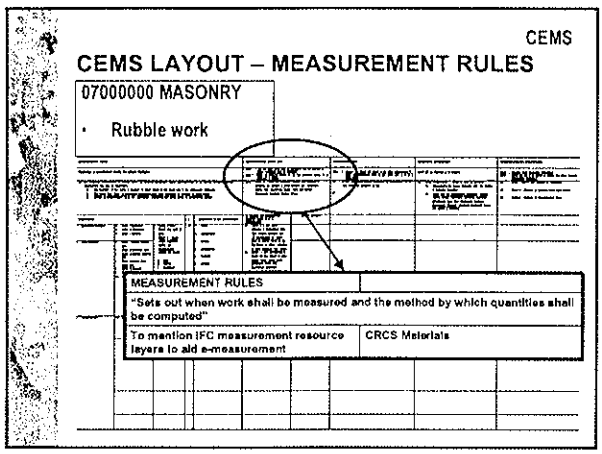


CEMS

CEMS LAYOUT – MEASUREMENT RULES

07000000 MASONRY

- Rubble work



CEMS

CEMS LAYOUT – DEFINITION RULES

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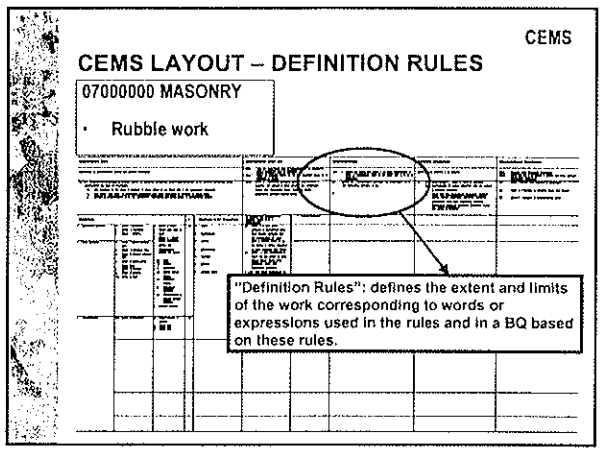
- Rubble work



CEMS

CEMS LAYOUT – COVERAGE RULES

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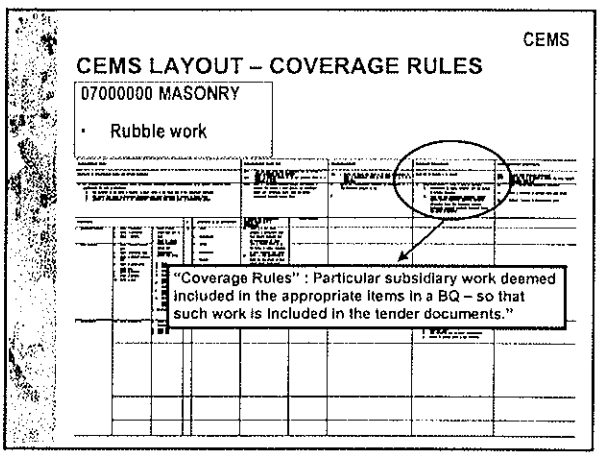
- Rubble work

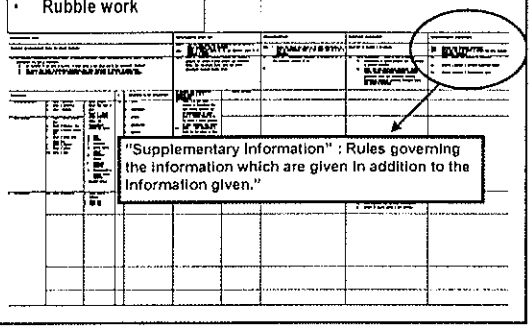


CEMS

CEMS LAYOUT – SUPPLEMENTARY INFORMATION

07000000 MASONRY

- Rubble work



CEMS

TRANSITIONAL REQUIREMENTS

- Familiarising with CEMS, CRCS, NPQS
- Initial IT investment
- Training
- Restructure data base libraries
- Progressive conversion

CEMS

BENEFITS OF CEMS APPLICATION

- Enhanced documentation
- Easier and standard interpretation
- Less "related" claims and disputes
- Common platform for software development

CEMS

PRACTICAL IMPLICATIONS OF CEMS/AQTS AT TENDER STAGE

- E-Tender ready
- Overall shorter tendering period
- Accurate estimation and cost control
- More confidence in quantities
- Eliminate duplicated efforts
- Cheaper tendering cost
- Competitive tender prices?

CEMS

ADAPTING YOUR IT SYSTEM FOR CEMS