WATER ON THE WEB

Paper Presented by :

Andrew Chapman

Author:

Andrew Chapman, *Principal Engineer*

PPK Environment & Infrastructure

64th Annual Water Industry Engineers and Operators' Conference
All Seasons International Hotel - Bendigo
5 and 6 September, 2001

WATER ON THE WEB

Andrew Chapman, *Principal Engineer*, PPK Environment & Infrastructure Pty Ltd (PPK)

ABSTRACT

In this era of lean, performance focused Water authorities, efficient and broad access to system information, environmental, OHS and other relevant regulations, , and customer data is essential to monitor, operate and service customer needs efficiently. Staff in a multi-skilled environment also need access up to date information quickly and easily to respond and complete activities. Further, customers and regulators are requiring more information to be publicly available and easily accessible. Web based technology is an ideal means to delivery these needs both internally within the business and externally. This paper seeks to explore the opportunities and possible applications of Web based technology, which could benefit the operations side of the Water industry.

KEY WORDS

Internet, Web, Asset, Operations, Innovation

1.0 INTRODUCTION

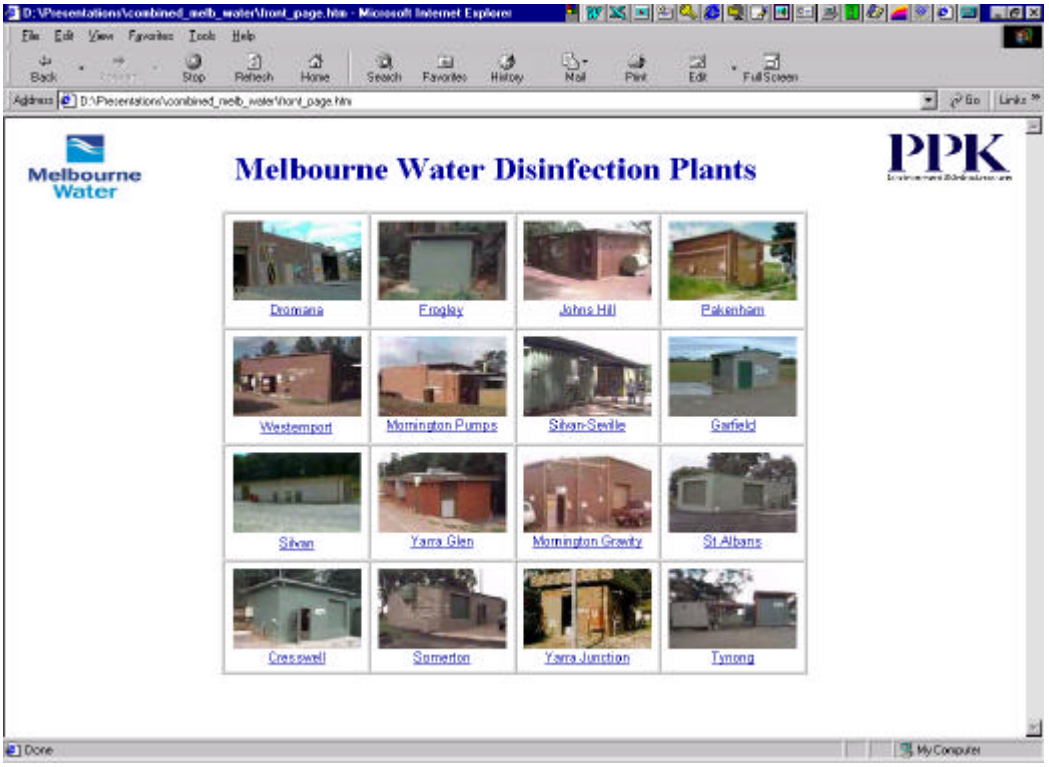
The internet and its associated web based technology is revolutionizing information access, commerce and business generally. It is seen as the next big technological revolution impacting on all elements of modern society. Advances in the area, are happening quickly, due to the tremendous resources being committed to development and multimedia application of the technologies. This technology and systems have significant potential to enhance Water industry operational efficiency.

Most Water authorities have their own Web sites for public information and use internal intranets for internal bulletins and information. Many are in the process or considering establishing E-Commerce and customer information sites. Web based technology has the potential to provide much more in improving internal Water Authority operational efficiency and information access.

2.0 WEB TECHNOLOGY

Web based technology has the potential to allow broad controlled access to all business data across the internal network (intranet) of a Water authority, or across the world via the internet. Through storing the information on a CD it can also be accessed by a stand alone computer. A single computer CD can store enormous amounts of information, PPK was able to store operation and maintenance manuals for 16 of Melbourne Water's disinfection plants including all supplier information and drawings on one half of the CD.

What Web technology provides is a common single point access information databases and systems. The systems are designed for multi-user access by low power computers with limited communication speed "phone lines", resulting in a very efficient means of handling and transmitting information throughout a water authority.



These Web based systems have significant advantages over traditional single purpose built interfaces including:

- Able to access information using a common web browser throughout the business network and externally via the web and soon mobile phones.
- User friendly graphical interfaces which can incorporate photo's, plans and other graphics, which make data and information easier to access and understand.
- Different ways to access information.
- Can incorporate real time information or directly access databases to provide the latest information to the user.
- Allows broader access to central databases from regional offices and vice versa.
- Referenced information can be directly accessed by "hotlinks" in web documents eg drawings, reports, supplier information.
- Improved Quality Control, as only one "document" is required to be maintained on the system which is accessed by all users through an internet browser.

3.0 TYPICAL APPLICATIONS

There are numerous applications where web technology can enhance Water Industry operations, outlined below are a few:

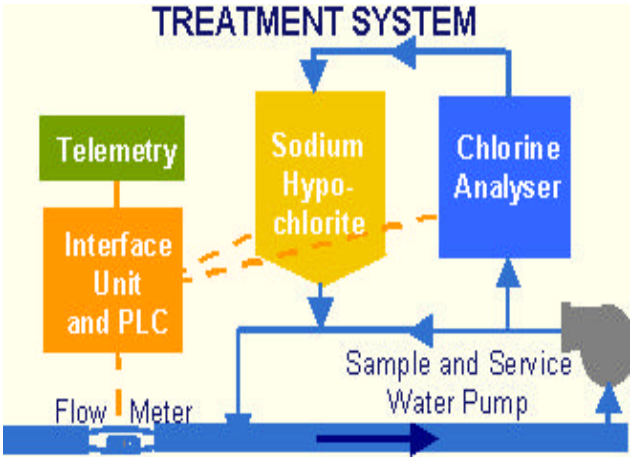
3.1 Operational and Maintenance Manuals

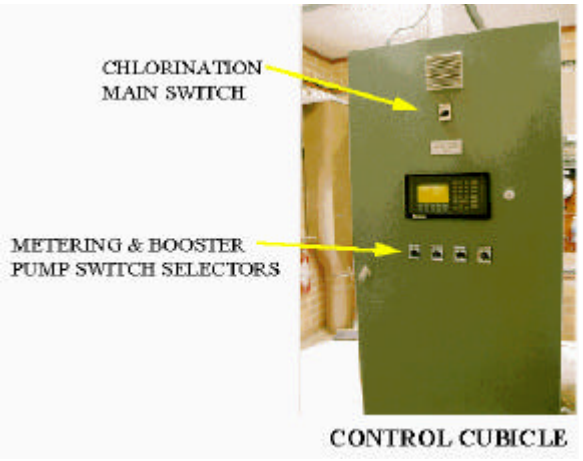
Traditionally with each new plant equipment, 2 to 3 paper copies of operation and maintenance manuals are required to be supplied, which end up on a bookshelf at the plant and progressively go out of date.

The majority of the business does not know where the information is and cannot access it easily when required.

A web based alternative is a hyper text document with embedded pictures and flow diagrams

which allow several people to see the same information at the same time. This is especially useful if trying to discuss issues over the phone. "Hyperlink" text to referenced information which when selected bring up plans and scanned photos or manuals. Increasingly equipment suppliers have there own web sites, which can be also linked to the document.



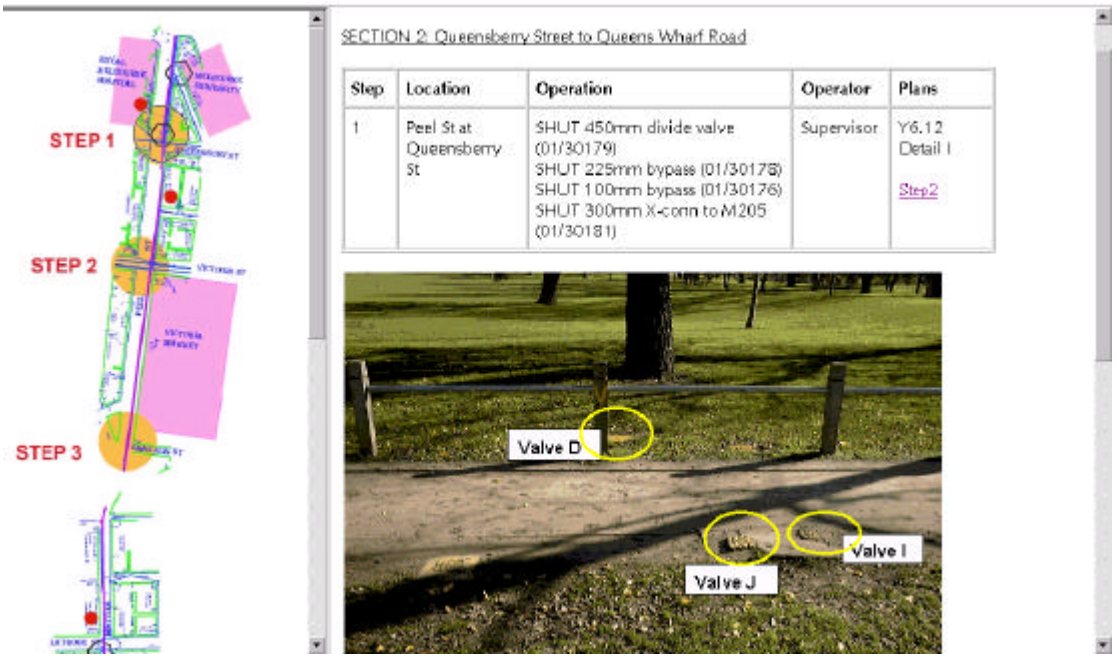


3.2 Performance Monitoring and Reporting Tool

Water Authorities collect and manage an large range of performance monitoring data to measure, monitor, benchmark, and report to the regulators and the community. This information is collected both internally and externally by outside collectors, and is used in a variety different of ways and levels of detail. Generally the source data are numbers and the most common reporting form is graphical. A web based interface is capable and able to handle multiple users at any one time in different formats. Web applications can provide external interface where laboratories and other providers can download result data over the internet. Internally they can provide automatic Email alerts, access to SCADA monitoring and graphical monitoring, result plots, which allow staff and management to more easily monitor performance of selected facilities at any time.

3.3 Contingency and Emergency Response Plans

Are ideal applications, as they usually require accessing a broad range of information quickly need to be accurate, but are rarely used. A web based response plan can be set up with links to access the various databases directly, ensuring it is accessing the best available information and avoiding duplication. The information can also be put on CD for field operations staff to access remotely.



3.4 Asset Management Systems

Most Water authorities hold asset databases on Geographic Information Systems, which are powerful and expensive mapping tools. The information held in the systems is typically used across the water business, but it is expensive to provide multiple licenses across the organization. A web based solution South East Water Limited has developed is "AssetWebMap" which enables the GIS to be viewed throughout the organization, and to registered consultant clients across the internet at a relatively low cost.

3.5 Management Systems

Quality, Environment Management, OH&S, HACCP and other standard management system procedures are now commonly being stored on authorities intranet systems. These management systems require documents to be controlled and updated, whenever a procedure is changed. In a paper based system this can be an administration headache to track down manuals and ensure pages are replaced. In a web-based system, the controlled document is the intranet database and when it is updated, the whole system is updated. So as long as staff reference the system for procedures there is confidence the most current procedure is being used.

Regulatory requirements and other information such as dangerous goods material data sheets are becoming increasingly available on the internet as subscription services. Within management systems and operational procedures links to these services can be easily established to ensure up to date regulatory requirements are available a common requirement of management systems.

3.6 Plan and Report Libraries

The plan room has traditionally been a critical part of any water authority's information base, as its plans hold most of the design and as constructed information of major assets. Because these plans are usually stored on paper or microfilm, the information has been restricted to a physical location. It is now possible to scan this information into electronic format and most new information is already in electronic format and make it available all across the intranet.

Numerous consultant and internal reports are done on most aspects of water authority operations. These reports typically end up with the client(s) project manager and eventually end up lost in a file somewhere and are difficult to retrieve. Similar to plans, reports can be more broadly available across the intranet and may prevent some repetition of work.

4.0 ISSUES IN USING WEB SYSTEMS

In developing previous web based Operations systems PPK has discovered a number of approaches which greatly improve the results and maintainability of the system:

- Use simple links and standard web presentation. Ideally operators should be able to write documents in MS Word, and convert directly into a Web document onto the system. If they require special plug in software, they are difficult to maintain.
- A data structure which is modular avoids duplication of information and allows growth in capability.
- A data structure which is logical so that information is consistently stored in the same structure. This avoids loose ends and sloppiness in the system, which is especially important for system growth.
- Layered information so that the most used information is at the top and quick to access, while more detailed, occasionally used information is deeper down. Users tend not to use Web manuals if they have to click down more than 3 times.
- Avoid data repetition. This will reduce the chance of conflicting information in the future.
- Provide both a text link and a visual link where possible. Some people are text oriented and others are visual.
- Use lots of digital photos of equipment; as they enhance the context of the equipment to the reader.
- Use simple colour graphics for element selection, traditional engineering P&ID's and engineering drawings are unreadable on a web browser screen
- Review supplier information, drawings and other hardcopy information before scanning the documents, as there is often standard irrelevant information included.
- When scanning documents critically review the format it is saved in and the resolution of the scans as this can significantly reduce the size of the scanned document files from 1 Mb per page to 60 kb per page

5.0 FUTURE DIRECTIONS

Changes in the web are happening at frantic pace with increasing efficiency of data communication, diversity of multimedia applications and range of means to communicate. There is and continue be an increasing range of services available in improving quality, from a variety of platforms. The net result for Water Authorities are improved access for staff to information systems via a variety of differing means, improving flexibility of operations. Potential options are:

Decentralized work operations with many staff working from home or small regional offices, with access to the full information resources of the organization via the Web. Communication between staff could be by video phones, video conferencing using webcam's either on the PC or mobile phones.

Palmtop/Mobile phone information tool, with the proposed new "3rd generation" mobile phone spectrum. These mobile devices will be able to fully access web capabilities and therefore world information systems.

An operator will be able to carry around in his back pocket all the plans and operational information of the system and will be able to log in activities, equipment requests, maintenance call outs, on site immediately not relying on having to get back to the office.

Web camera's allow viewing of remote locations to potentially check status and remote control of facilities from home. Mobile web cameras can also be used for providing live visual context in the field back to the office or remote from site, even across the world. The mobile cameras could be a separate unit or even in a mobile phone. A good example might be in an extreme emergency

response situation the world leading expert in a situation might be able to be consulted live from another country.

"At desk" training of staff on ones own computer, of new changes or procedures via an interactive Web based presentation will become increasingly common. Multimedia presentations will become progressively easier to produce, and will have in built interaction with the participant. The system will also be able to track who has done the training and how well the participant did in responses to the training.

6.0 CONCLUSIONS

Water authorities have traditionally been great warehouses of data (asset data, customer information, trade wastes data, flow and monitoring, and a wide variety of documents and reports). Access to this data tended to be restricted by the database systems or selected personnel holding the data. This has tended to result in information being held in specialized pockets within organizations and not being as fully utilised or able to be accessed when needed.

The amount of regulatory requirements and information management and staff are required to be aware of, to be "Duly Diligent", has increased by several orders of magnitude and is continuing to expand. Tracking changes, making sure manuals and documents are up to date and ensuring staff are aware of changes is becoming an administration nightmare for many authorities.

In this era of lean, performance focused Water authorities, efficient and broad access to information systems is essential to monitor, operate, and service customer needs efficiently. Staff in a multi-skilled environment need access up to date information quickly and easily to respond and complete activities. Further, customers and regulators are requiring more information to be publicly available and easily accessible. Web based technology is an ideal means to delivery these needs both internally within the business and externally.

7.0 ACKNOWLEDGEMENTS

Goulburn Valley Water.
Western Water.
South East Water.
Melbourne Water.

8.0 REFERENCES

Crumlish C; "1997", *The ABCs of the Internet 2nd Edition*, Sybex, USA

Hutchings K; Pyman G; "1999"; *Use Of An Intranet For Consumer Information, Complaints And Emergency Response*; AWA 18th Federal Convention Adelaide, SA

Woolnough P; Nov "2000"; *Moving to 3rd Generation Communications*; Engineers Australia; Aust.