

A plot that leaps off the page

Bentley's ProjectWise Dynamic Plot uses intelligent paper to 'persuade' recalcitrant engineers to go digital, says David Chadwick

There are some who regard the vast majority of architects, contractors, engineers and so on who continue to rely on paper documents as old-fashioned in their thinking. Especially when we now have the ability to take digital documents out on site with us and mark them up directly on laptops and other mobile devices.

And yet most of us still rely on hauling hard copy around and applying the old red pencil liberally - a process now considered inefficient, time consuming and prone to error.

A recent study showed that the average project produces about 10,000 drawings, and that it takes an average of 15 minutes to manually transfer each markup back onto the digital document. As the same source revealed that around 80% of such documents are actually marked up, that represents 2000 hours of unnecessary work. With the best will in the world, transferring data manually also introduces the possibility of errors in transmission - and rectifying errors takes a darn sight more for each drawing than the average fifteen minutes!

If we are still finding it difficult to persuade people to modify their workflow and subscribe fully to the digital revolution, then we should look for ways to accommodate the digital revolution to more closely fit their working practices.

DYNAMIC PLOTTING

And, surprise surprise, we can do this without compromising the fundamental goal of the process - to allow project members to comment on and mark-up documents on site, and to transmit their efforts back to be incorporated within the original digital model as rapidly and as error-free as possible.

This has been made possible by Bentley with the introduction of ProjectWise Dynamic Plot - based on its ProjectWise collaboration system. A software and hardware solution, it allows users to mark-up paper documents in the normal manner, but records the process digitally in a manner that can be

subsequently, and rapidly, relayed back to update the original document.

The hardware comprises a digital pen and its docking station, allowing data collected by the pen to be downloaded to the user's workstation or laptop, and transmitted digitally back to the office. The digital data that it records is the pen's movements in relation to the printed document - the freehand mark-up of the document.

To be able to do this, the digital pen must know where it is on the sheet of paper. To make the information relevant, it must also know the serial number, title, revision level and any other unique classification data pertaining to the document. And here we come to the clever bit.

DYNAMIC PAPER

Involved in the printing and CAD industries for some considerable time, I have been aware of moves towards dynamic paper with various manufacturers. Now matured, the technology is finding its way into a couple of markets - with the latest, the ability to transmit information directly off the printed sheet using Bentley's Dynamic plot, being especially significant.





Here, the paper itself is 'intelligent'. It is marked in such a way that the digital pen can pick up unique information about each sheet of paper. Printers and plotters are currently capable of producing copy at very high resolutions and with incredibly small dot sizes. Besides plotting out a 2D plan, the background, or empty space on the plot, can be used to lay down an exceptionally fine screen of dots in a pattern instantly recognisable by the software behind the digital pen. Each screen pattern is different, and allows the software to identify one document from another.

The screen appears as a light grey mesh over the whole sheet. The digital pen, besides knowing the title of the document, is also able to instantly orientate itself within the document - and, therefore, record any subsequent moves made by the pen.

MAKING THE MOST OF THE TECHNOLOGY

The technology is not unique to Bentley - but this is the most effective use of it. You can, if you wish, purchase sheaves of plotter paper that have already been overprinted with the identifying screens. Naturally, such paper is a bit more expensive than plain paper, and has to be numbered sequentially. Purchased

from stock, it cannot provide prior differentiation between documents to be marked up and those that aren't. Consequently every drawing is printed onto expensive paper - unless you are prepared to swap paper rolls in and out.

Bentley's ProjectWise Dynamic Plot works on a different basis. Sure, you pay for using the paper. The developers need to recoup their investment through charging royalties to the companies using the technology (another reason why pre-printed paper costs so much). This charge is relayed to ProjectWise Dynamic Plot users as Ink Credits, but only when they mark-up the documents and synchronise the mark-ups with the original models - i.e., a pay-as-you-go solution where nothing is charged until they extract value from the process.

The two software elements support the process. In the first instance, the ProjectWise Dynamic Plot Service is used to apply the dynamic layer to the paper whilst it is plotting out the drawing. This is handed out to the contractor in exactly the same way that plans always have been.

The second piece of software transmits the recorded mark-up data back to the main server, using Bentley's ProjectWise Dynamic Plot Sync software, where it is added to the original digital document as synchronised vector data.

DYNAMIC RESULTS

"The more work we do on computers, the more paper we create." A heartfelt plea from Kevin van Haaren, ProjectWise Administrator, HNTB, who provided the data above. Recognising that paper-based drawing review workflows are slow and out-of-synch with the design process, he asked Bentley to come up with a solution.

HNTB wanted to integrate paper and the PC more efficiently, to capture mark-ups in real-time and to provide a means of conducting immediate, error-free data transfers without losing any data. The solution was ProjectWise Dynamic Plot, which the company has been trialling with excellent results. Engineers hardly have to change their working processes. They mark-up in exactly the same way they have always done, except that when they have finished marking up a document they place the digital pen in the docking device attached to their computer. The Dynamic Plot Sync software takes care of the rest, using the intelligence it has picked up from the document to cross-reference the data it possesses with the right document on file.

Satisfied with the way it works, HNTB is now rolling out Dynamic Plot to each of its offices across the United States.

www.bentley.com/projectwisedynamicplot