



The Dirt Digger

Welcome...

To the first Y2K issue of Dirt Digger, the newsletter designed to update our customers, distributors and partners on the latest from 4D Solutions. We'll send you issues regularly throughout the year to keep you up-to-date with developments in 4D's world.

We've started the year with a bang and in this issue we look at major new customers locally and internationally and how we're growing the business both in Australia and overseas with the appointment of new distributors.

Highlighting local successes in this issue are two customer case studies -- the Snowy Mountains Engineering Corporation which, using 4D Model, is engineering an auxiliary spillway to protect the Warragamba Dam; and the largest road construction project ever undertaken in Queensland, the Pacific Motorway, for which the highest value contract was awarded as a joint venture project to John Holland Construction/Barclay Mowlem Pty Ltd.

Our stories examine the specific problems encountered by the engineers or surveyors on each project and the innovative ways in which 4D Model was utilised to overcome them.

We have also included an update on our web site content which we are constantly enhancing to provide you with the most up-to-date information on all our products and services.

This newsletter is for your information and if you have any comments or story ideas, helpful technical tips, or questions we can answer, please be in touch with us.

Have a healthy, happy and prosperous 2000.

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Into 2000 on a roll!

A move into a new year, and especially a new era, usually engenders some reflection on that which has just past and a contemplation of what the future holds.

1999 was a record year for us and it seems 2000 will continue in the same strong vein.

January is only just behind us and already we have had significant successes with, notably, sales to the Australian Army surveyors and then sales to the US Army Corps of Engineers following close behind.

While we continue to maintain our high level of technical people and platforms, such as our comprehensive web site, to support our products and customers we are also building our sales force to meet a growing demand for our products.

We have appointed a distributor in NSW - Tony Ingold of Lakeshead Services. Tony will be based in the 4D offices at Narrabeen and is responsible for sales, support and training in NSW and the ACT. Many users in NSW will already have met or spoken to Tony.

We also have a new sales person in WA. Most of you in WA will know Maria Bernhagen who was previously with Condor and is now 4D sales, based in Perth; Alisdair McCrudden continues in the role of technical support in Perth.

As we ramp up in Australia, things are going strong overseas as well. Our UK distributor, Waterman IT, a subsidiary of the Waterman Group (profiled in *The Dirt Digger*, October 1999 issue) has enjoyed a number of sales. The company continues to receive wide acclaim for its role as both the structural and civil engineers in what is renowned as Europe's most innovative and exciting retail and leisure destination, the Bluewater project www.bluewater.co.uk. 4D Model was 'discovered' on this project and has become integral to the project's development.

Also on the international front, we are about to appoint a North American distributor. We'll bring you more details once negotiations are finalised.

1999 saw continued growth in all Australian states and internationally. If the strong start 4D has had for 2000 is any indication, the inherent growth path looks set to continue through the "new era".

4D helps to build Queensland's "Smart Road"

One of the most heavily trafficked routes in Australia is the Pacific Highway between Brisbane and the Gold Coast. Traffic using that section of the Pacific Highway has increased more rapidly than on any other highway in Australia, quadrupling since the road was built in the 1960s. To address the problem of the increasing strain of south-east Queensland's transport infrastructure, the Queensland State Government has developed an Integrated Regional Transport Plan for the region.

Part of this plan is to upgrade the Pacific Highway to an eight and six-lane Motorway between Logan, just south of Brisbane, and Nerang, on Queensland's Gold Coast. A Queensland Department of Main Roads project, it is the largest road project ever undertaken in Queensland and is to be completed by September 2000.

For construction purposes, the 43km Motorway project has been divided into six sections with contracts awarded to a variety of engineering firms. The highest value contract - \$120 million - was awarded as a joint venture to John Holland Construction/Barclay Mowlem Pty Ltd for eight lanes for the section Logan to Stapylton, a distance of 7.4km, due for completion in March 2000.

Integral to construction of this section of the Motorway, is the use by the John Holland/Barclay Mowlem Surveying Department of 4D Model.

Robert Smith, the surveyor primarily responsible for running the computing operations of the joint venture's Surveying Department, has developed an application based on 4D Model which, he explained, "allows me to manipulate the huge amounts of data involved to create the individual layers which make up the road and extract various quantities out of it".

His application involves taking the initial output, received as design files and natural surface files, from Queensland Main Roads and, using 4D, to convert this data into what he describes as "useful 4D data sets". Robert then creates cross sections on various alignments and applies 4D Model's boxing or template functions to create various layers which are then triangulated.

The volumes of various materials used in the different layers which comprise construction of a road - from the embankment layer through the various layers of gravel on top of that, to the paving and bitumen components - are then calculated in order to determine the quantity for payment purposes on completion of the work.

The design files are also used concurrently with traditional plans to aid the construction process. Macros are used to create files for "TP SETOUT"

software, run by the field surveyors in their HP 200 palm top computers.

From data in the natural surface file and survey data collected by site surveyors, further 'layers', such as existing ground, existing underground services, are created in data sets to aid the construction process. This means potential clashes between the profiled string and services, such as telephone lines, electricity cables, gas lines and drainage and water pipes, are easy to detect. In a further step, an existing ground model is triangulated for future volume calculations.

Triangulation has options to calculate surface area, depth contours (isopachs) and the intersection of triangulations, and options for slope, aspect and viewshed analysis. Colour coding can be used for the slope and aspect analyses.

The advantage of using 4D Model, Robert says, is that in the manipulation of all the data the 'layering' steps entail, "4D lets us run unlimited data sets and points and it's very fast at running volumes".

He says 4D Model's boxing, template and volume computations have "made the job a lot easier and faster, and its interactive capabilities provide immediate feedback at every stage. It is also easy to use," he added.

Training in NSW/ACT

4D's New South Wales distributor, Tony Ingold of Lakeshead Services, has finalised the training program for the first part of the year, and will hold training courses in Sydney, Newcastle, and Canberra, with Wollongong added to the list later in the year. Courses will cover Basic and Advanced road design, and a Macro writing course is also being offered.

Stormwater Engineers are being catered for with three Workshops covering 4d Model's interfaces with HEC-RAS, Drains, and XP-RAT2000. Trainers from these respective hydraulic software packages will combine forces with the 4d trainer, to provide a forum where tricky problems can be worked out.

For more information please visit our web site at www.4d.com.au or call 4D on (02) 9970 7117.

Sydney Seminar

4d Model users in NSW will be interested in the 4d Model Seminar, which is to be held at the North Sydney Leagues Club on 9 March, 2000.

This will be an opportunity to see the latest developments in 4d Model and to meet other users in a relaxed atmosphere.

All 4d Model users are invited to attend, but prior registration is required. Those who are interested in being involved in a User group in NSW/ACT are particularly encouraged to attend.

Engineering the Auxiliary Spillway at Warragamba

The major source of Sydney's water supply is Warragamba Dam. Australia's fourth largest dam, its primary function is to provide a water supply for the Sydney Metropolitan area. When adequate quantities of water are stored to meet these needs, electricity is generated and fed into the NSW grid by the hydro-electric power station located at the base of the dam.

Warragamba Dam is in the High Incremental Flood Hazard category and to prevent overtopping of the dam in extreme flood events, an auxiliary spillway is being constructed adjacent to the dam to divert floodwaters in excess of the capacity of the existing spillway.

The auxiliary spillway is a major civil engineering project due for completion in mid-2001. The works are being undertaken on a design and construct basis for the Sydney Catchment Authority (previously known as the Sydney Water Corporation) to improve the safety of the dam. In December 1998, the contract for the design and engineering of the spillway was awarded to SMEC, the Snowy Mountains Engineering Corporation.

The project involves major excavation - some 1.8 million cubic metres of sandstone and overburden is being removed and transported to a spoil emplacement - and the concrete lining of the auxiliary chute spillway which will be approximately 650 metres long and drop 50 metres before discharging to the river.

Five fuse plugs - embankments that are designed to wash away when overtopped - are being built at the upstream end of the spillway chute to prevent the auxiliary spillway from operating in flood flows smaller than about a one in 750 chance of occurrence in any year.

Generally, the floor and wall of the spillway chute are in the form of a reinforced concrete lining against the excavated rock surface, however, one section of the spillway over an existing creek line will be constructed on compacted fill with cantilever walls on either sides.

A bridge across the spillway, and a new road, are designed to provide access to the crest of the dam, the Valve House and the hydro-electric power station at the base of the dam.

Following concept design carried out by the Department of Public Works and Services, SMEC is responsible for the development of the detailed design - from concept to production of construction drawings. A vital component in SMEC's engineering design work is 4D Model. Design draftsman on the project, Michael Kurtz, says it contains all the options necessary to produce a digital terrain model (DTM), including fast triangulation, contouring and sectioning routines, and

to calculate spill volumes for accurate placement and subsequent costing of the work carried out.

Warragamba Project Manager, John Gray, said 4D Model software was primarily used for design and modelling of the auxiliary spillway and associated access structures such as roads and the bridge approach, along with calculation of spill volumes.

"Using 4D allows us to continually modify designs," Michael said, "and, most importantly, to do it quickly. 4D allowed us to complete re-designed versions very fast for presentation to the client and to show the designs interactively in plan and sectional views. We also had to continually modify the design to fit the spoil emplacement within specified confines nominated by the client. The spoil would not fit into the area initially defined and required many modifications of the design.

"The perspectives we can provide using 4D are an easy way to convey a design to people who find engineering plans and contours difficult to interpret," Michael said.

SMEC uses the 4D alignment module to construct strings consisting of horizontal and vertical geometry. These horizontal and vertical components are created and edited interactively using the IP method on plan and section views.

SMEC is also using the 4D Drainage Module in the Warragamba project. This module supports the display of drainage networks typically required for development projects and new land subdivisions.

An added bonus SMEC encountered using 4D was the ease with which the model output could be checked at any stage of the design process.

Following development of a design component, a copy of the model was produced for checking and further development by design engineer, Tim Loffler. Tim, who had no previous training in the software, said he found it "a most intuitive package" and that he could view and interrogate the model after getting a feel for the way in which the program operates.

"The program is very robust and will faithfully do what you ask it to do," he said.

The Tipster

Warning to customers running 4d Model on a Novell network with VET virus software

After opening up a 4d Model project that is stored on a Novell server, the symptom is that strings and models are locked for no apparent reason (to test that no reason exists, restart the project with the option Project=>Restart and check if the strings/model are still locked).

The solution is to turn off the VET software.

Making your life easier

In the October issue of *Dirt Digger* we told you about the work we had done on our web site to improve the overall look and feel and, more importantly, to make it more valuable to our clients by extending it to include far more information. Over the last few weeks we've continued with the upgrade and added even more pages and sections to make the site a quick and easy, one-stop information source on all our products and services.

New categories on the site include **Client Projects** which let you see how other clients are effectively using 4D to streamline their projects. Their stories also tell how many of them have introduced innovative applications of 4D Model and associated drainage and HEC-RAS modules, to enhance their terrain modelling, surveying and civil engineering projects, and to simplify otherwise time-consuming and tedious tasks.

We've also introduced a category headed **Frequently Asked Questions** in which we answer those questions most often raised by our customers. Check it out and you may find a ready solution to that niggling question or problem which has been worrying you. You may also discover features and functions which you haven't even tried yet! Of course, our technical support people are always available to personally help with any trickier technical issues.

4D Model Practice software can be downloaded from the web site for trial operation. A **What's New** section provides the latest updates to our software. You can also gain access to electronic versions of the **4D Model Reference and Training Manuals**. There are a number of **Downloadable Macros** on the site also. And the back issues of *The Dirt Digger* newsletter are all on the site for easy reference.

Please go to www.4d.com.au to make your (work!) life easier!

The Tipster

Do not copy models from one 4d Model project to another 4d Model project using Microsoft Explorer.

If you use Explorer and overwrite an existing model in the project, it will delete existing information that can't be replaced and cause problems with strings in the new model.

You should always use the 4d Model option Models=>Utilities=>Copy project model to copy models between projects, or write the data out in 4D Ascii format (File I/O=>Data output=>4D ascii) to transfer to another system.

Welcome Aboard

Sorry but due to lack of space, some of our new licenses/additions must be left until the next Dirt Digger

Aspect Design & Drafting – NSW
 Babbie Group – UK
 Blacktown City Council - NSW
 Canberra Contractors - ACT
 Cardno (MBK) – Qld
 Connell Wagner – NSW
 Coras Iompair Eireann - Eire
 Coomes - Vic
 Cossil & Webley - WA
 Dept of Defence - School of Military Eng – NSW
 Development Engineering Consultants - WA
 Engineering Setout – NSW
 Ernest Henry Mining – Qld
 Flanagan Consulting Group - Qld
 Hyder - Vic
 J A Liddle – Qld
 Jeff Brown Surveys – NSW
 Jensen Bowers Group - Qld
 Kinhill – Qld
 Lawson and Treloar - Qld
 Leeton Shire Council - NSW
 Lynton Surveys – NSW
 Maroochy Shire Council - Qld
 Maunsell McIntyre – NSW
 Qld Main Roads – Survey - Gympie, Toowoomba
 Qld Main Roads – Design - Bundaberg, Roma
 PPK – Qld
 R B Deep – NSW
 Sinclair Knight Merz – Qld
 TriCAD Design - NSW
 Uli Schneider - NSW
 WBCM – Vic
 Western Power – WA
 Worsley Alumina - WA
 WP Brown – ACT, Qld, Vic

Top sales & support

4D Solutions is committed to providing not only the best civil engineering software on the market, but also the best service and support.

Expert sales support is available from:

Tony Ingold, B. E. (Civil), at 4D Solutions in NSW, Tel (02) 9970 7117, Fax (02) 9970 7118;

Maria Bernhagen at Critical Image in WA, Tel 0411 601 066, Fax (08) 9314-3241;

Steve Crossley, B.Eng. (Civil), MIE Aust., at SCS Software in Vic, Tel (03) 9802 8849, Fax (03) 9803 1057;

Ian Cameron, B. Sc Ph.Eng.(I.T.C.), Registered Surveyor, at Technical Solutions in Qld, Tel/Fax (07) 3378 8702;

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