



The Dirt Digger

Welcome...

to the December 1996 issue of Dirt Digger, 4D Solutions' newsletter for our customers, distributors and partners.

This issue carries something for everyone! We have case studies from WP Brown, a leading engineering company in Canberra and the AutoCAD user of the year, and the Port of Brisbane which is using 4D Model in its 20 year project reclaiming land from the sea for a major port.

We have the winner of the draw at the recent Engineering Computer Hardware and Software show and an overview of the new features in the latest version of 4D Model, version 3.1.

And last but not least, we have a range of Technical Tips to help you make the most of your 4D Model. The Tips are based on the experience of users like yourself and on our knowledge of the software. If you have Technical Tips which you would like to share with other 4D users please fax or email them to us.

We look forward to hearing from you.

Dr Lee Gregory
Managing Director

Mr Alan Gray
Technical Director



Happy Holidays!

The 4D Solutions team would like to take this opportunity to send Season's Greetings to you and your family. We thank you for your support in 1996 and wish you all success in 1997.

4D Solutions Pty Ltd

ACN 056 019 713

Email: agray@4d.com.au

PO Box 103, Narrabeen NSW 2101

Aust. Tel. 02-9970 7117 Fax. 02-9970 7118

Int'l. Tel. 61 2-9970 7117 Fax. 61 2-9970 7118

3.1 in Santa's Sack

Version 3.1 of 4D Model will be delivered in December and holds as much promise as Santa's sack.

The version offers three major new features and a host of smaller upgrades and goodies.

SuperTINS, already proving their worth at a number of Beta sites are now fully integrated into the package.

With SuperTINs the user can combine existing triangulations to form the equivalent of a merged triangulation without having to completely re-build a merged model and re-triangulate it. This means there are less steps in creating a merged triangulation so a lot less time is required and there is less opportunity for errors.

Decisions for battering allows, among other things:

- complicated cut and fill requirements including multiple strata, decisions based on depth below one or more strata or strings, multi-level decisions (i.e. depth decisions followed by fixed elements, more depth decisions, etc); and
- extended battering including repetitive battering, fixed width batters, and battering relative to a string or strata.

Kerb return function enables the user to rapidly create and edit kerb return alignments and gives the ability to immediately see the effects of the entire intersection design.

Other new features include dynamic measures, re-triangulate functions, 'undo' for many operations, extra plot parameters, and extensions to the macro language.

Congratulations

John Wallace of Sydney engineering company CMPS&F was the lucky winner of the 4D Solutions draw at the Engineering Computer Hardware and Software exhibition in October.

John won 4D Model software and training to the value of \$10,000. We wish John all success in his use of 4D Model.

Canberra Designers See 4D Benefits

The speed and flexibility of computer software has radically altered the way many civil engineers work. However, no two jobs are the same and Canberra-based company W P Brown & Partners says it is 4D Model's ability to be customised for each job that makes the software excel for them.

"Using 4D Model's programming language, we can develop new tools and tailor the software to meet specific needs," said Philip Baird, Senior Designer and Computer Manager, W P Brown & Partners.

"At present, we are writing macros to assist in designing pavement resurfacing, which is an increasingly important aspect of road maintenance.

"A traditional approach to the road maintenance is patching, involving digging a big hole in the road and filling it with the most expensive material around: asphalt. Recently, a number of more cost-effective and efficient techniques were developed. In addition to the structural improvement, they involve changing of the finished road surface, thus providing a riding comfort far superior to the patched road.

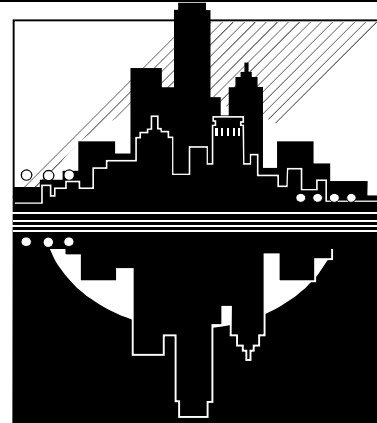
"Resurfacing design is an art of finding a fine balance between the structural and geometric requirements, the former either by maintaining good or improving poor road geometry. The engineers start with the minimum strengthening required and then try to improve the geometry; but if, say the applied asphalt overlay is much thicker than justifiable, it will cost extra money. This is where the overlay design tools come into play: to help designers in minimising the quantity of expensive resurfacing material required.

"Our pavement overlay macros put a powerful and easy-to-use design tool in our pavement engineers' hands," said Mr Baird. "They are now able to quickly assess the consequences of the proposed geometry changes and ensure that the adopted solution is close to the optimum."

These new roading tools were developed as part of a job tender but are being refined. They may become a future module available to all 4D Model users.

And the capability is there: for the past three years in succession, W P Brown & Partners have won *CAD User* magazine's "AutoCAD User of the Year" award for its software development work.

While he admits that "Canberra is an AutoCAD town", Mr Baird said there was a lot of room to work with 4D Model as well, since the two packages do not clash, but rather complement each other.



"We tend to have 4D Model and AutoCAD open at the same time. If we want to draw something, we use AutoCAD and save the file in DXF format. Using <Alt-Tab> keystroke, we change to 4D Model, where we import the DXF file and keep working.

"The interface and exchange of information between the two packages (AutoCAD and 4D Model) is very easy and it does not cause any problems," said Mr Baird.

A significant portion of the work W P Brown & Partners undertakes in Canberra is subdivision land servicing. This includes the design of roads, intersections, sewers, stormwater, water reticulation and associated floodways.

All roads, intersections and sites are graded using 4D Model. This information is used to produce drawings of long sections, cross sections and grading contour plans.

Mr Baird said W P Brown & Partners' head office previously used another well-known software package, but the company was benefiting from changing to 4D Model.

"4D Model is a number of times faster than the former package just in sheer processing speed. It is also quicker and easier in day-to-day use because of its advanced graphical user interface (GUI) design. GUI provides an intuitive feel so that, if designers are not sure what to do next, they do not have to dive into manuals."

He also pointed out that cut and fill volumes and volume balances are automatically calculated by 4D Model whenever certain design changes are implemented.

"We can assess the material requirements for a particular three dimensional road model, and then keep trying different ideas until we are happy - all in real time! This interactive design capability is provided at an enormous speed compared to other software packages.

"The designer can get quantities 'on the fly' from a very sketchy design and keep refining it until meeting the design objectives.

"4D Model has addressed some big shortcomings of other popular software packages. The most impressive 4D Model feature is the way users can manipulate multiple surface models.

"In 4D Model, triangulated surface models are stored as Triangulated Irregular Networks (TINs). TINs can be combined in SuperTINs, a new feature of 4D Model; one TIN can belong to more than one SuperTIN. The best part is that the component TINs retain their identity: if a TIN is changed, all SuperTINs it belongs to are automatically updated. In other words, if only one short road in a big subdivision is changed, it will not be required to re-triangulate the whole area.

"There is another level of dependency between TINs and SuperTINs: 4D Model lets users set up TIN priority. The user can decide which TIN is in the background (say existing ground model) and which ones are on top (say noise mounds, floodways, roads etc.)

"We are now able to work on a job as a whole so that the inter-relationship between the component parts become seamless".

Mr Baird described "significant productivity gains" from 4D Model's live project views. All commands are transparent so users do not have to change models or open and close different parts of the program. This facility produces major client benefits as more alternatives can be studied and the final design optimised giving aesthetic and economic benefits through improved marketability and lower cost.

W P Brown & Partners has been using 4D Model on eight Windows NT computers for a year and Mr Baird said the staff were still excited about using it.

"We have employed people from other places that were using other civil engineering software. They are amazed by the program. They say things like: 'I'm used to doing this on the other package this way, but suspect 4D has an easy way; what is it?'. "

The Tipster

A view can be quickly redrawn by simply clicking (pressing and releasing) the middle mouse button (MB) anywhere in the view title area. The middle button can also be used to redraw panels and menus (and pop them to the top of other menus and panels) by clicking MB in the panel or menu title area.

4D Model Provides Land and Sea Data

4 D Model is proving to be equally at home on water as it is on land.

The Port of Brisbane Corporation is proving the flexibility of 4D Model by using it for volume checking, contour checking and road design on its development at the Fisherman Islands.

Fisherman Islands is located at the mouth of the Brisbane River. The area was a group of four islands which have been joined by reclamation. Over a 20-year period Fisherman Islands has been developed into one of the most modern container and bulk handling ports in the world.

The site has already out-grown its original land and future expansion has been provided for with the recent reclamation of more than 70 hectares using material dredged from the main access channels in Moreton Bay and the Brisbane River.

This reclamation involved moving 2.6 million cubic metres of sand using the Pearl River dredge which was contracted from Holland. The massive amount of material was shifted in 10 weeks and 4D Model was used to calculate pre- and post-dredge volumes.

These volumes are used to measure the amount of sand moved and provide the data for the \$16 million payment to the dredging contractors.

4D Model is also used to provide 3D views of the Brisbane River bed.

"4D Model provides us with dynamic views of the river bed which permit the observer to clearly understand its profile," said a Port of Brisbane Corporation draftsman.

The nature of the work carried out by the Port of Brisbane Corporation highlights 4D's use as a general purpose civil engineering tool. The software can effortlessly provide volume calculations for roading, dredging or landfills.

Engineering surveys are carried out by the Corporation's surveyors using Total Station equipment. The surveyors process this data using Geocomp and send the resulting information by modem to a network of Digital workstations which run the Ultrix operating system and 4D Model.

"All that data is imported into 4D for checking contours, terrain modelling and volume calculations," the draftsman said.

4D Model has also been used in the design of a service road network, as well as a major access road and an open drain on the Moreton Bay side of Fisherman Islands.

"The biggest benefit of 4D Model is its speed, accuracy and ease of use. It is powerful and can be programmed to do what you want it to do. The other very big factor is the local support; if you have a problem you can get it fixed very quickly."

Port of Brisbane draftsmen said while 4D Model is not in use every day, the five members of the CAD unit can turn to it as required and quickly complete their work because of its easy-to-use graphical user interface.

Welcome Aboard

Central Goldfields Shire (Vic)
 CivCon Engineers
 Connell Wagner (Vic)
 Cossill Webley (additional licenses)
 Dawson Fisher Stewart
 Fisher Stewart (Bairnsdale, Shepparton)
 Gold Coast City Council (additional licenses)
 HMS Perunding (Malaysia)
 HT Maltec Consultants (Malaysia)
 Hyder (formerly Acer Wargon Chapman)
 Kinhill Engineers (Perth)
 Main Roads Queensland (Barcaldine, Townsville, Nerang)
 Nanango Shire Council (Qld)
 Roads and Traffic Authority, NSW (Wollongong)
 Sinclair Knight Merz (Perth)
 W. P. Brown & Partners (additional licenses)

Top Service & Support

4 D Solutions is committed to providing not only the best civil engineering software on the market, but also the best service and support. Expert pre- and post-sales support is available from:

Dr Lee Gregory, *Ph. D. (Maths)*, or Alan Gray, *B. Eng (Civil)*, at 4D Solutions, Tel. (02) 9970 7117, Fax. (02) 9970 7118;

David Francis, *M Sc Civ Eng*, at Condor in WA (formerly Integrated Technical Software), Tel (09) 322 2377, Fax (09) 322 2380;

Peter Strods, *B. Eng. Grad Dip Sys Anal Grad Dip Munic Eng*, at HDS Computing in SA, Tel (08) 8267 4577, Fax (08) 8239 0111; or

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

Desmond Siau, *B.E. Hons (Civil), C. Dip. A.F., MIEM, M. Eng.*, at Sunsoft AEC Services in Kuala Lumpur, Malaysia, Tel. (+60 3) 783 7707, Fax: (+60 3)780 2262

The Tipster

The Shade option cannot be run on a hidden perspective view. That is, the 4D Model Hide and Shade options cannot be run together.

The Tipster

The tab key, <tab>, can be used for name completion in most panel fields. When typing information into a panel field (for example a model field) then if <tab> is selected after one or more characters has been typed, a list of all possible answers starting with the given characters is displayed. Hence <tab> can be used to speed up selections.

Reader Response Form Dirt Digger, December 1996

Name: _____

Title: _____

Company: _____

Telephone: _____ Fax: _____

Email: _____

Postal Address: _____

Existing Civil Software: _____

Existing CAD Software: _____

Existing Computer Hardware: _____

Do you have a CD ROM: _____

Are you re-evaluating your civil software: _____

If yes, when (approx.): _____

Would you like more information on (please tick):

4D Model Version 3.1 _____ 4D Model Seminars _____

Training _____ Add to mailing list _____

Please fax to 4D Solutions -- (02) 9970 7118