Regrade Program

Abigroup Contractors Pty Ltd

Regrade Program

END USER: Carls Ryan and Hooman Rabet Eshaghi CLIENT: Abigroup START DATE: 2012 COMPLETION: 2012

12d DIMENSIONS:

Customisation



Delphi regrade interface screenshot

Project Summary

Automation of redesigning (regrading) the vertical alignment of a surface based upon surveyed points or known differential values.

For more information

To find out more about how you can create better designs faster with the 12d Model solution for civil engineering design, visit www.12d.com.



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The Challenge

During the process of construction, it is not uncommon that a proportion of the surface does not meet the final design (tolerances) or specified minimum layer thicknesses. In such circumstances, it is possible that the contractor may incur a penalty for being outside specifications, or have added costs in materials for rectification.

It was with this in mind that LendLease (then Abigroup) first developed a spreadsheet that allowed semi automated regrading to conform to RMS (previously RTA) specifications.

The spreadsheet worked well for providing a solution to the regrading of a surface, but required many steps to calculate values, as well as an innate knowledge of the regrading process to ensure errors were not overlooked.

Another macro was developed by an external source that was also semi automated and required many steps to provide a suitable outcome.

As 12d Model software was already in use by the survey department across Abigroup as a whole, it was decided that the only way to improve and standardise the process was to provide an 'in house' solution that manipulated the data directly to and from 12d Model in a manner that suited their requirements. This also meant that it could quickly be distributed across the company with very little training due to the familiarity of 12d Model.

The Solution

12d Model software was employed as the main component of the regrade program,

with support from the Embarcadero Delphi programming language. A 12d Model macro was written that would accept the survey data and provide conformance information. This information, combined with the design data and user selected criteria (*e.g.* ride quality and thickness), was passed to the Delphi module, and the regrade function them took place.

Users could specify fixed locations within the data (such as bridge abutments or existing tie-in points) and decide upon the vertical rate of grade change allowed. The program combined the data and the parameters and through an iterative process produces, within 12d, created new design strings to satisfy all criteria. If satisfying all criteria was not geometrically possible, the user was notified and could then choose to modify or accept the input information.

It is vital to maintain traceability of data; therefore user parameters such as lot number, user, date/time of regrade, original z value and comments were passed from the Delphi module to 12d Model and saved within the new design strings as attributes.

The interface of the program is very user friendly, and for an experienced Abigroup 12d operator posed no problem with either data input or assessing the results.

Result

The development of this powerful program greatly reduced the time taken to regrade a surface. It provided Abigroup with cost and time savings, as well as increasing the quality of the finished product for clients.



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Roads and Highways

12d Model's design option is the smarter solution for the design, modification and maintenance of Road and Highway projects.

Enjoy advanced 3D tools to design local and major roads, intersections, roundabouts, highways, interchanges and much more.



Land Development

12d Model is the most versatile solution for the creation of sustainable land development projects, including residential, commercial and industrial developments, recreational areas, landfills, and agriculture projects.

Easily manage all aspects of your land development project from earthwork quantities, road design utilities and drainage design.



Rail

12d Track has been specifically designed for the survey, design and construction of light, heavy and high speed rail projects.

Extensive railway tools in 12d Track allow the rail designer to quickly and easily design their projects. These options are built on the existing 3D modelling and design tools available in 12d Model.



Drainage, Sewer and Utilities

12d Model provides comprehensive tools for the design, analysis and optimisation of stormwater and sewer projects using rational, dynamic (hydrograph) and 2d drainage methods.

Powerful clash detection management allows for efficient 3D modelling of service networks such as gas, electricity, telecommunications and water prior to construction.



Oil and Gas

12d Model assists with the design, construction and mapping of oil and gas pipelines, original site exploration and the wide range of infrastructure required for oil and gas projects.

Accurate 3D modelling and the ability to share data between users allow teams to quickly and easily coordinate designs.



Rivers, Dams and Hydrology

12d Model handles very large datasets and interfaces with a wide range of analysis packages, making it perfect for flood studies and the management of rivers and dams.

12d has partnered with industry leading analysis software, allowing users to apply 2D drainage analysis from within 12d Model.



Ports and Dredging

12d Model is the solution for port infrastructure and dredging, easily managing the very large datasets and complex volume calculations often required by these projects.

A complete range of flexible and customisable volume calculation tools allow teams to extract and present the information quickly and easily.



Airport Infrastructure

12d Model provides a solution for the design, construction and analysis of new airports, as well as the upgrade and maintenance of existing runways and airport infrastructure.

Easily manage large airport infrastructure projects and share data across multi-disciplinary teams.



Mining Infrastructure

12d Model's powerful set of exploration, site investigation, survey and analysis tools are crucial for the initial design, construction and ongoing operation of mining projects.

Comprehensive tools for the survey, design and construction of access roads, railways, earthworks and services allow for the coordinated design and management of mining infrastructure from within 12d Model.



Surveying

12d Model is a complete surveying package providing the tools to manage all facets of surveyed data including LIDAR, topographical, as-built, conformance, traversing, geodetics, data mapping, labelling and much more.

The 12d Field option runs on a ruggedized tablet and gives the user access to full 12d Model functionality, allowing you to take the entire project into the field with the most comprehensive pick-up and set-out tools.



Construction

12d Model is the ultimate software for construction with powerful set-out options, direct interfaces to machine control and detailed conformance reporting and auditing.

Manage 3D data and control volumes, quantities and progress claims with 12d Model. Set-out your project and undertake conformance and as-built surveys live on-site using 12d Field.



Environmental

12d Model's ability to handle very large datasets combined with flexible and comprehensive 3D analysis and modeling tools make it perfect for a wide variety of environmental projects.

Existing workflows can adopt 12d Model easily as it allows users to directly interface with GIS systems and most software packages and file formats.

Why Choose 12d?

- · Powerful data processing & intelligent functionality.
- Modular, easy to update & completely customisable.
 Seamless integration with major industry software
- and hardware.
- Used in over 55 countries worldwide.
- Friendly support & training from industry experts.

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