Christchurch Rebuild New Zealand

Rebuilding the infrastructure of Christchurch

Stronger Christchurch Infrastructure Rebuild Team (SCIRT)

Disaster recovery

PROJECT OWNERS:

- Canterbury Earthquake Recovery Authority (CERA)
- Christchurch City Council
- NZ Transport Authority

START DATE: 2012
EXPECTED COMPLETION: 2017

SCOPE:

Rebuilding all horizontal infrastructure in Christchurch following the earthquakes of 2010 and 2011.

12d DIMENSIONS:

Roads and Highways, Land Development, Drainage, Sewer and Utilities, Rivers, Survey & Construction.

Project Summary

Commencing in 2010, a series of major earthquakes which devastated New Zealand's third largest city, Christchurch (population 375,000).

The damage to Christchurch's infrastructure was catastrophic. It is estimated that 1,021km of the city's roads needed rebuilding (51% of the total).

A total of 51km of the water supply mains were severely damaged; along with 150 retaining walls and major damage to the local reservoir. More than 12km of stopbanks along the river required repairs.

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 earthquakes starting in 2010 left Christchurch's infrastructure in ruins

The Challenge

One of the more exciting and proud achievements for SCIRT is the digital data cycle established to handle geospatial data from survey right through to as-built stage.

At the commencement of SCIRT there was no software package or system to undertake civil and surveying aspects of the project. There were fiive organisations (working in the alliance) who used multiple packages and methods for designing their infrastructure projects, all within their own environment.

During the first weeks at SCIRT, the organisations lobbied for a single platform to integrate all survey, drainage and civil design. At that time only about 30% of the 150 designers had 12d Model experience.

With 12d Model being the main choice of software, there was a need to learn a new package without slowing down progress. This was no mean feat. However, the team was up for the challenge.

The Solution

SCIRT mapped out a 12d based digital data cycle, received endorsement from the leaders, and went to work on the architecture. The theory was that they could achieve a 'field to finish' approach with the following steps:

1. Survey data would be captured in a standard format, and delivered to SCIRT from an external survey team in 12da format.
2. Information is then validated, and made available (via 12d Models sharing option) for designers to utilise in civil their design.
3. Digital data is then issued to the constructors from 12d Model in digital, industry standard formats.
4. When construction is complete, an as-built survey would be carried out and delivered back in a simple digital format (such as CSV).
5. As-built information is then imported into 12d Model and compared with the original design data.
6. Information is then transferred directly to the GIS system via 12d Models GIS link, and then transferred to the City Council electronically which forms the digital asset records.

Result

SCIRT has achieved its ambitious vision. The 150 designers were rapidly up-skilled by learning 12d Model and becoming productive within weeks.

This was achieved by first customising the 12d libraries and conventions to a standard, and then developing and facilitating training sessions to allow the designers to get up to a productive level.

The whole system is now delivering the planned $50 million of civil infrastructure into Christchurch each month.

12d Model

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.

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.

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.

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.

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.

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.

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.

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.

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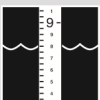
Accurate 3D modelling and the ability to share data between users allow teams to quickly and easily coordinate designs.

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.

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.

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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